FORT UNION COAL

TRACT SUMMARIES

SEPTEMBER 1981

FORT UNION COAL REGION

TRACT SUMMARIES

MONTANA

BLOOMFIELD
CENTRAL BLOOMFIELD
BURNS CREEK
CIRCLE WEST I
CIRCLE WEST II
CIRCLE WEST III
REDWATER I
REDWATER II
SOUTHWEST GLENDIVE

NORTH DAKOTA

NORTH WIBAUX-BEACH
SOUTH WIBAUX-BEACH
ZENITH
SCHOOLHOUSE
UNDERWOOD
NORTH BEULAH
RENNER
ANTELOPE
WERNER
DUNN CENTER
TRUAX
SAKAKAWEA
GLENHAROLD
GARRISON
CENTER

September 1981

Michael J. Penfold
State Director

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MONTANA

NORTH DAKOTA

SUMMARY

INTRODUCTION

This report summarizes the consequences of leasing and developing federal coal reserves in 24 tracts within the Fort Union Region of eastern Montana and western North Dakota. These 24 tracts were identified by the Bureau of Land Management (BLM) through a screening process under the overall direction of the Fort Union Regional Coal Team made up of federal, state, and local officials. The tracts are being evaluated for potential federal coal leasing in a coal sale scheduled by the Secretary of the Interior for June 1983. (See Maps 1 and 2.)

Early steps in the present federal coal management program identify and analyze individual tracts containing federal coal with high potential for development. A detailed evaluation called site-specific analyses (SSA) is completed for each tract. This report summarizes the results of the SSA documents.

Historically, development of a new mine in the Fort Union Coal Region has been associated with a coal conversion facility (power plant) in the vicinity of the coal mine. For this reason, the Regional Coal Team directed the BLM to evaluate the impacts of a typical facility near each potential new mine. A preliminary facility evaluation report (PFER) was prepared for each facility. All of the PFERs are also summarized in the present document.

The Fort Union Regional Coal Team will begin ranking and grouping selected tracts into alternative leasing patterns for the 1983 lease sale, using information from these individual reports. These groupings of tracts will form the basis for alternatives in a regional environmental impact statement to be prepared during 1982. The analyses summarized in this report represent an important step in a lengthy evaluation process that will conclude with the final decision on federal coal leasing within the region.

Of the 24 tracts currently being evaluated, 16 would require the opening of new mines. One of these 16 would be specifically earmarked for small business. The remaining eight tracts constitute coal which would be needed to maintain production or prevent the bypass of federal coal at an ongoing mining operation.

Approximately 1.6 billion tons of recoverable federal coal lie within the areas being evaluated. Final designation of some areas as unsuitable for mining under the 1977 Surface Mining Control and Reclamation Act will likely reduce the amount of federal coal actually available for leasing and development, and could remove several of the 24 tracts from further consideration. This information will not be available until early 1982.

A major purpose of this summary is to acquaint the public with key issues and consequences of the leasing and development of federal coal reserves, in order that they may (1) offer comments to the Fort Union Regional Coal Team on what factors they consider most important to be evaluated and analyzed in the ranking of the tracts and in the Regional EIS, and (2) offer specific advice on what decision alternatives the Coal Team should look at most closely.

In analyzing the tracts and facilities and preparing the two types of reports, a number of standard assumptions were made to provide a basis for impact analysis. These are as follows:

SSA ASSUMPTIONS AND VARIABLES

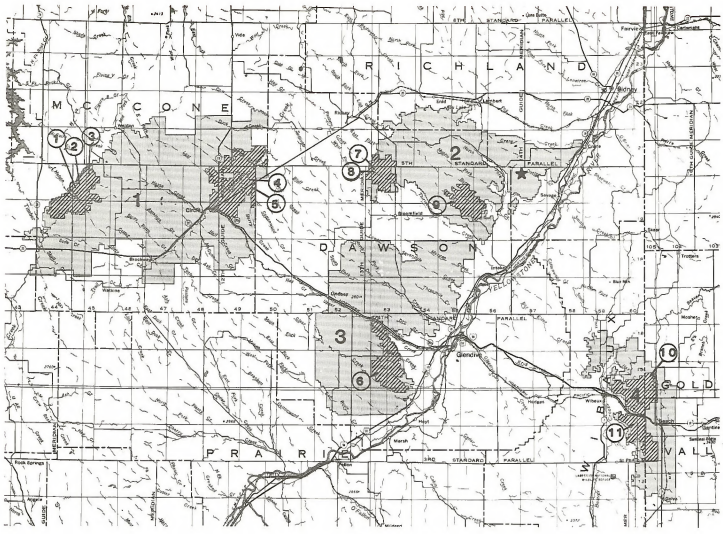
Consumption of coal would occur on-site.

Analysis is based on a worst case situation; in other words, the actual impacts felt would not be greater than the impacts addressed.

A buffer zone would be considered for any existing oil wells on the tract. Some pipelines may have a 100-foot buffer or be relocated around the tract.

The economic analysis is based on the results of a contract with Mountain West Research, Inc. The analysis was based on information from city/county planners, community leaders, U.S. Geological Survey, and BLM, and utilized the Bureau of Reclamation Economic Analysis Model (BREAM). The regional income estimates for the tracts and facilities are based upon historical expenditures by companies developing tracts and facilities.

The community service adequacy ratings reflect assessments by either city-county or regional planners for the communities involved and constitute the planners' best judgments concerning the fiscal (revenue/cost) situation likely to be encountered by the communities in peak construction and full operation years. Some of the services are more important than others in maintaining public health and safety. Basic services—sewage collection and treatment, water supply and water storage/distribution, health care and police/fire protection—are of more immediate concern to community well-being than are nonbasic services such as recreation facilities. Consequently, communities which experience impacts to basic services would undergo somewhat greater difficulties than would a community which experienced impacts on its nonbasic services. It can be difficult for a community to cope with inadequacy of basic services (water and sewage systems especially), because of the relatively large capital expenditures required for upgrading these types of services.



PRELIMINARY TRACTS

Redwater and Golden Valley

KRCRA Areas

1 Circle

2 Burns Creek-Thirteen Mile Creek

3 Southwest Glendive

4 Wibaux-Beach

Tract Delineation Areas

(1) Circle I

(2) Circle II

(3) Circle III

(4) Redwater I

(5) Redwater II

(6) Southwest Glendive

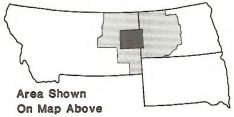
(7) Bloomfield

(8) Central Bloomfield

(9) Burns Creek

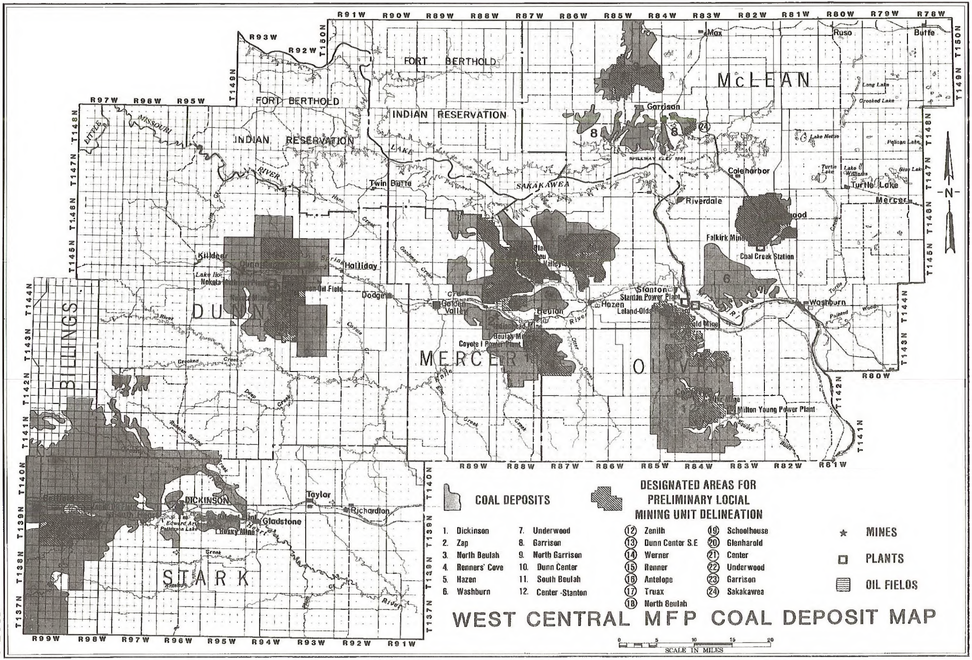
(10) North Wibaux-Beach

(11) South Wibaux-Beach



★ Savage Mine

MAP 1


WEST CENTRAL MFP COAL DEPOSIT MAP
COAL DEPOSITS
DESIGNATED AREAS FOR PRELIMINARY LOCIAL MINING UNIT DELINEATION
1. Dickinson
2. Zap
3. North Beulah
4. Renners' Cove
5. Hazen
6. Washburn
7. Underwood
8. Garrison
9. North Garrison
10. Dunn Center
11. South Beulah
12. Center -Stanton
(12) Zenith
(13) Dunn Center S.E
(14) Werner
(15) Renner
(16) Antelope
(17) Truax
(18) North Beulah
(19) Schoolhouse
(20) Glenharold
(21) Center
(22) Underwood
(23) Garrison
(24) Sakakawea
MINES
PLANTS
OIL FIELOS
SCALE IN MILES
McLEAN
MERCER
OLIVER
DUNN
STARK
BILLINGS
FORT BERTHOLD INDIAN RESERVATION
LAKE SAKAKAWEA
Garrison
Coleharbor
Riverdale
Turtle Lake
Mercer
Max
Ruso
Butte
Twin Butte
Killdeer
Halliday
Dodge
Golden Valley
Beulah
Hazen
Stanton
Stanton Power Plant
Washburn
Falkirk Mine
Coal Creek Station
Milton Young Power Plant
Coyote I Power Plant
DICKINSON
Gladstone
Taylor
Richardton
Husky Mine

MAP 2

Front-end financing by industry would not be available.

PFER ASSUMPTIONS AND VARIABLES

Siting

The facility is assumed to be located near a tract. This eliminates the arbitrary siting of facilities. Where specific site location information was available, it was used in the facility analysis.

Facility Type

Typical facilities would include a 1,000-megawatt electric power plant, a 250-million standard cubic feet per day synthetic gas facility, and an 85,000-barrel per day synthetic liquid fuel facility—based on existing use of lignite coal in the region, tract size, planned synthetic fuel projects and expressions of leasing interests.

Facility Size

Electric Power Plants

A typical electric power facility is assumed to consist of two 500-MW units. A facility of this type would require approximately 600 acres of land. To maintain plant operation, five and a half million tons of lignite coal would be mined each year for 40 years.

Gasification Plant

The Great Plains Coal Gasification Project utilizing the Lurgi process is the basis for the assumptions and variables used. A gasification plant would typically produce approximately 250-million cubic feet per day of gas using the Lurgi gasification process. Such a facility would require approximately 960 acres of land, and thirteen and a half million tons of lignite coal would be mined each year for 40 years.

Indirect Liquefaction Plant

The Nokota Company's proposed methanol plant was used as a basis for many of the assumptions concerning indirect liquefaction. Such a plant would use the Lurgi process followed by conversion of synthetic gas to methanol. Industry proposes to utilize this process over the next decade. Such a facility would require approximately 960 acres of land, and 14 million tons of lignite coal would be mined each year for 40 years.

Construction Period

Electric Power Plant

A typical facility would be constructed by phases. The second unit would be started in the third year after the first unit is begun. The total construction period should cover approximately eight years. This document recognizes that industry may change priorities and thereby change population and employment figures.

Gasification and Indirect Liquefaction Plants

A typical synfuels plant is assumed to have a two-phase construction period with each phase lasting four years. The two-phase method would enable a company to produce earlier, make an earlier return on its investment, and utilize the technical experience gained in constructing the first phase on future construction.

Employment

The construction schedule would determine the size of the construction work force. Figures for the size of the work force are from the Basin Electric Power Cooperative, American Natural Gas Service Company (ANG), and the Nokota Company. The average yearly employment figures are based on the projected work force for the Antelope Valley Power Plant (1,900 people at peak construction) and the Great Plains Gasification Plant (3,000 people at peak construction). The generic methanol facility uses the same construction schedule and work force as the generic gasification plant. Employment figures for the facilities, once they are in operation are taken directly from Basin Electric, ANG, and Nokota.

Water Requirements

The Fort Peck Reservoir and the Yellowstone River are assumed to be the water sources for facilities located in Montana; Lake Sakakawea is the assumed source for the North Dakota facilities. These were used as sources because Fort Peck Reservoir and Lake Sakakawea represent the most likely and least controversial sources of water, and potential facility developers have expressed interest in utilizing the Yellowstone River. The amount of water consumption would vary with the type of facility and its specific requirements. Values used for water requirements are based on estimates from Basin Electric, ANG, and Nokota. An electric power plant is expected to use 13,000 acre-feet per year; gasification and indirect liquefaction facilities would use 12,000 and 11,500 acre-feet per year respectively.

Air Emissions

Air emissions for a coal conversion plant primarily depend on: the facility production process, the amount of coal burned, the quality of coal burned, the level of pollution control, and whether the facility produces its own electric power.

The electric power for all facilities is assumed to be produced on-site with coal-fired boilers and steam turbines. Air emission rates are estimated from what the Great Plains Gasification Project would emit if it pro-

duced its own electric power. Air emissions would be a function of the emission control technology and would also vary depending on the quality and quantity of the coal burned. The quantity of coal burned could vary from 11 to 14 million tons per year.

Air Emission Rate[1]

Facility	Particulate Matter	Sulphur Dioxide	Nitrogen Oxides
Electric Power	376	7,528	5,644
Gasification	575	4,600	2,800
Indirect Liquefaction	231	2,600	4,420

[1]pounds per hour.

Solid Wastes

Estimates from Basin, ANG, and Nokota are the basis for solid waste calculations. The amount of waste and sludge could vary depending on ash content and pollution control technology.

Solid Waste Rate

Electric Power Plant

160,000 lbs./hr. Fly Ash/Scrubber Product
20,000 lbs./hr. Bottom Ash

Gasification Facility

202,000 lbs./hr. Ash
36,000 lbs./hr. Sludge
56,000 lbs./hr. Water

Indirect-Liquefaction Facility

234,000 lbs./hr. Ash
28,000 lbs./hr. Sludge
88,000 lbs./hr. Water

BLOOMFIELD

The Bloomfield tract is approximately six miles north of Bloomfield and ten miles south of Richey, in northern Dawson County, Montana. The land is used primarily for farming and ranching.

The tract contains about 9 percent (136 million tons) of the federal coal under current consideration in the Fort Union Region.

One economically recoverable seam of lignite coal is in the tract. It ranges in thickness from 14 to 30 feet. Overburden ranges from less than 150 feet to 200 feet in thickness. The generic mining plan calls for a surface mine using draglines, electric shovels, bottom-dump coal haulers, scrapers, and other support equipment. A gasification plant would utilize the coal.

The tract contains two inactive small mines which closed down in 1968. The nearest active mine is the Savage mine, which is 20 miles east of the tract. The tract lies on the western flank of the Williston Basin, where oil and gas exploration, discovery, and production are increasing. The tract contains no producing wells.

The south portion of the tract is gently rolling terrain.

SITE SPECIFIC ANALYSIS

Minerals

Because the tract is in the Williston Basin, it has a potential for oil and gas development. Coal mining and associated operations preclude or inhibit certain phases of oil and gas exploration. Coal mining could delay exploration activities for six to eight years, or even for the entire productive life of the mine.

Wildlife

Mining would reduce the available winter forage, causing a redistribution of wintering white-tailed deer to other land south of the tract. Damage to crops and haystacks could result and could be significant to individual operators.

Mining would remove approximately 2,486 acres of essential mule deer winter habitat including a narrow corridor leading to 122 more square miles of essential winter range. This would force deer onto flat, less secure habitat, where they would be more vulnerable to hunting and poaching.

Destruction of the habitat would cause some reduction in the numbers of animals in the herd and consequently reduce hunting opportunities in the area. This would be a long-term irreversible impact.

Cultural

Information on cultural resource values in the area is insufficient to predict the presence of significant sites and/or artifacts. The potential loss of cultural resources (due to mining) can be considered significant, unless more information is collected to indicate otherwise. Inventory being contracted now would raise the level of confidence that loss would or would not occur. The loss of identified values, if any exist, would be long-term and irreversible.

Reclamation

Intermixing of calcareous horizons would increase the salinity of the soil and make reestablishment of vegetation more difficult. Special handling of overburden, which would increase the cost of mining, may be required. The salinity problem should be resolved in a mining plan, after more data have been collected and analyzed.

Economic and Social

Construction and operation of a mine in the Bloomfield tract would result in significant impacts upon services in some Montana communities. Savage, Lambert, Fairview, Glendive, and Circle would experience significant increases in both population and employment.

Peak employment during the construction phase of the Bloomfield mine is expected to occur in 1986 at 265 employees, with full operations employment expected

in 1991 at 450 employees. The communities of Savage, Lambert, Glendive, and Circle would be expected to experience an inadequate level of one or more community services as a direct result of the 1986 peak construction employment/population levels. Glendive's water supply, for example, would be inadequate. Fairview, West Glendive, Richey, and Sidney would experience an inadequate level of some community services by 1986, even without tract development. A mine-related population influx would cause these services to fall behind even further in meeting the needs of the communities.

Full operation of the Bloomfield mine (1991 and beyond) is also expected to result in minor impacts to community services. Fairview would have inadequate fire protection as a direct result of the population influx associated with tract operation. Lambert, Glendive, West Glendive, Richey, Sidney, and Circle are forecasted to face inadequate public services by 1991, even without development of the tract. Development would worsen inadequate service structures. Sidney and Glendive-West Glendive are sufficiently large to accommodate additional population from the Bloomfield tract. Sidney has experienced rapid growth due to oil and gas activity.

Dawson and Richland counties are very similar in several ways with relatively economically diverse, stable or, in the case of Sidney, growing populations. A clear majority of respondents in a BLM random sample survey favored development.

Sidney in Richland County and Glendive-West Glendive in Dawson County, are sufficiently large to accommodate additional population from the mine. In addition, Sidney has had considerable recent experience with rapid growth and development due to oil and gas activity. In both Sidney and Glendive-West Glendive, the long-term population change during the operation of this mine would be roughly 5 to 7 percent over the baseline. Thus, it is not expected that coal development would be particularly disruptive to the existing and future social atmosphere.

Other communities in the area such as Lambert, Fairview, Savage, and Richey would also experience some short-term population growth. These four communities are quite small in population, and less diverse socially and economically than Sidney and Glendive-West Glendive.

It appears that development of the tract would, considering the existing population base and recent exposure to other forms of energy development, be minimal in terms of long-term social effects.

The majority of respondents in both Richland and Dawson counties stated that the small town, friendly atmosphere was the element they appreciated most about their communities. This factor would be disrupted to some extent by energy development because of the necessary population change. For most long-term respondents such changes would not be of such a scale to detract seriously from the benefits of residing in these areas.

Agriculture

Developing the coal in the Bloomfield tract would have a significant short-term impact on individual agricultural operations in the area. By the end of the mine life, 12,892 acres of the tract would be disturbed, and 160 additional acres would be used for mine facilities.

An average of 155 acres of cropland, excluding summer fallow, would be removed from production each year, resulting in an average annual loss of 4,402 bushels of wheat. This cropland would be out of production ten to fifteen years, with a maximum of 1,530 to 2,318 acres out of production in any one peak mining year. The total loss would range from 43,452 to 67,620 bushels of wheat.

Peak mining year disturbance of 267 acres of hayland would result in a maximum annual loss of 267 tons of hay production.

An average of 129 acres of rangeland would also be removed from production each year, resulting in an average loss of 25 AUMs (animal unit months). This rangeland would be out of production ten to fifteen years, with a maximum of 1,266 to 1,918 acres out of production in any one peak mining year. The total loss would range from 247 to 374 AUMs.

Regionally, these losses would not significantly reduce agricultural production, but some individual operators would be severely impacted. Agricultural production on the tract averages from 16 to 29 percent of the combined total production of all 21 grain and livestock operators. The lowest percentage is for hay production, which affects only a few of the operators who raise hay. One operator raises all his hay on the tract; another has 60 percent of his hayland on the tract.

FACILITY ANALYSIS

The coal mined from the tract would probably be used in a gasification plant located near the mine.

Agriculture

Approximately 960 acres for the facility site would be taken out of agricultural production. In a worst-case analysis, 13,632 bushels of wheat would be lost annually for the life of the plant (based on current land use distribution.).

A short-term disruption of 12 acres per mile would result during construction of an undetermined length of water pipeline. Roadways would disturb 14.5 acres

per mile. A railroad spur would eliminate agriculture on 18 acres per mile for the entire life of the gasification plant.

Potential negative impacts to vegetation and to livestock exist downwind from a gasification plant due to nitrogen oxides, sulfur dioxide, and particulate matter (West-Central North Dakota Regional Environmental Impact Study on Energy Development, 1978). These negative impacts would be analyzed in detail by the state permitting authorities during their review of facility permit applications.

Water

Water requirements for a gasification plant are approximately 12,000 acre-feet per year. The likely source of water would be Fort Peck Reservoir. Present regulations require state approval of disposal sites for facility wastes of ash, sludge, and water.

Recreation

Recreation facilities in the region (community camping and picnic areas, Fort Peck Reservoir, and Charles M. Russell National Wildlife Refuge) are expected to receive the bulk of recreation demand from the projected increased population. The social attitude survey revealed a concern for existing recreation facilities. It was also stated that an increase in population might result in the upgrading of currently marginal recreation facilities.

Wildlife

Wildlife impacts associated with the gasification plant could occur in two ways: 1) impacts from destruction of habitat and 2) impacts from the increase in human population. Removal of vegetation for a 960-acre gasification facility and the expansion of urban areas, highways, and railroads would prevent or reduce the use of an area by wildlife regardless of the type of vegetation removed. A large area south of the tract is essential white-tailed deer habitat, and essential mule deer winter range lies west of the tract. Wildlife inventories should be completed in October 1981.

Powerlines, pipelines, and access roads could be constructed in key wildlife areas with partial or total destruction of habitat. Other anticipated impacts include eagle electrocutions on powerlines, migratory bird deaths from striking powerlines close to wetlands, road kills along transportation routes through wildlife areas, harassment of wildlife by off-road vehicle use, and increased poaching. These impacts, along with habitat destruction, would result in decreased wildlife populations in the area. Wildlife oriented recreation such as hunting and observation would have to be sought elsewhere.

Poaching and road kills have increased dramatically in areas of North Dakota, Montana, Wyoming, and Colorado where energy development has occurred. The problem is compounded where transportation corridors are in important wildlife areas and when employee shift changes coincide with wildlife feeding periods. This situation could occur in the tract area.

Taking water from shallow bays in Fort Peck Reservoir could have significant adverse impacts. These areas are prime nursery and spawning areas for sport, commercial, and forage fish. Removal of water could also involve removal of a percentage of young fish and/or eggs.

Aesthetics

The visual impact would be the penetration of the skyline by the facility as seen from communities and major transportation corridors. The 500-foot stack could potentially be seen 30 or more miles away and would evoke a response either positive or negative. The dominance of the facility in the landscape could be perceived as a loss of amenity through impairment of the landscape during the 40 years of the expected life of the plant.

Economic and Social

Construction and operation of the gasification plant would result in impacts upon services in some communities. Lindsay, Glendive, West Glendive, Richey, Circle, Lambert, Bloomfield, Sidney, Fairview, and Savage would experience increases in both population and employment.

Peak employment during the construction phase is expected to occur in 1987 at 2,617 employees, with full operations employment expected in 1993 at 900 employees. The above communities would experience an inadequate level of one or more community services as a direct result of the 1987 peak construction employment/population levels. Glendive, for example, would have inadequate sewage collection and treatment, water supply and storage, and police protection.

Full operation of the gasification plant (1993 and beyond) is also expected to result in impacts to community services. Savage, Glendive, Sidney, Lambert, and Fairview would have inadequate services due to the population influx associated with facility operation. Bloomfield, West Glendive, Lindsay, and Circle are forecasted to face inadequate public services by 1993 even without facility development. Development of the Bloomfield facility would further worsen inadequate service situations in these communities.

Richland and Dawson counties would absorb most of the social effects attributable to construction and operation of the facility. In these two counties, BLM contacted 68 residents in a random sample survey and

asked them for their thoughts on coal conversion facilities in their area. In the two-county area, about two-thirds of the persons contacted supported local coal conversion either with or without qualification. Roughly one-fourth of the residents expressed opposition to the construction of a facility in the area. Within both counties, the major concern attached to development was the possible degradation of the existing air quality.

Some persons in Dawson and Richland counties would be in a position to take advantage of plants locating in the area. This would include workers who either possess or could acquire marketable skills in the industry, some local retail merchants, and persons who would otherwise be outside the labor force but would be able to enter this job market. Some residents would be unable to capture economic benefits but would face an altered community situation, characterized by very rapid growth and instability (at least during the employment-intensive construction phase).

Respondents in Richland and Dawson counties were very favorable toward the existing social environment of the various communities. Rapid population growth would likely result in a less personable, less predictable community atmosphere. These persons would likely be less satisfied with their communities as a place to live than they would be without development.

Relative to other communities on the Northern Plains, Glendive-West Glendive and Sidney are heterogeneous, have had some experience with industrialization, and are fairly large in population size. These two cities, along with outlying communities in Dawson and Richland counties, would receive the bulk of the population effects associated with the Bloomfield facility. Because of their relatively large size, Glendive-West Glendive and Sidney are in a better position to deal with rapid growth than other communities in the region. The scale of population growth during the construction phase would be very significant and result in social (family, political, religious, leisure, and occupational) disruptions that would be evident to both long-term and incoming residents.

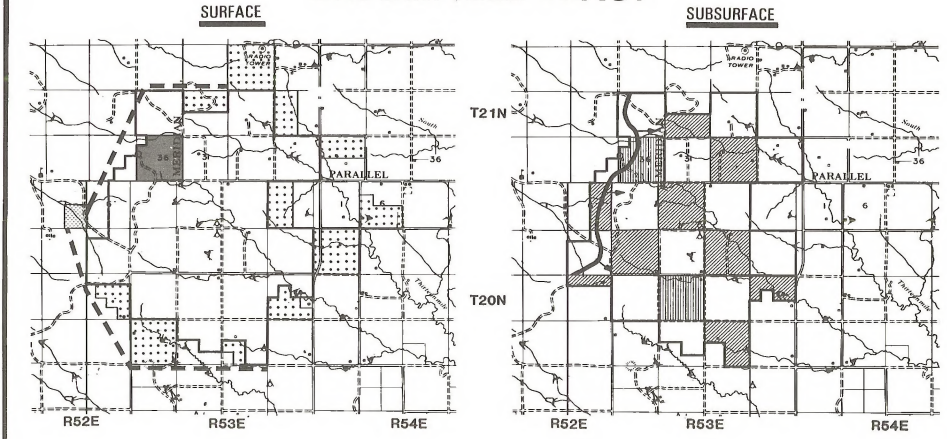
Growth management problems during the construction period at the city and county level would be substantial due to the magnitude and rapidity of population growth. Social and administrative capacities to deal with this growth during the construction phase would be severely stretched, but stability would probably be reestablished upon completion of construction.

Air Quality

Probable impacts to air quality were analyzed to predict compliance or noncompliance with Ambient Air Quality Standards and Prevention of Significant Deterioration (PSD) Standards for Class I and Class II areas.

With the use of a screening dispersion model for emissions from a gasification facility sited on the Bloomfield tract, it has been forecast that the facility would not violate Montana or North Dakota Ambient Air Quality Standards and would not violate PSD Standards for Class I and Class II areas. The increased concentration levels for TSP, NOx, and SO_2 resulting from the facility were forecast to be below the detectable level at the border of the Class I area of the Theodore Roosevelt National Park in North Dakota.

BLOOMFIELD TRACT



BLOOMFIELD
SITE-SPECIFIC SUMMARY MATRIX

COAL ECONOMICS

TRACT RANKING SUBFACTORS	PRESENT SITUATION	COMMENTS	INFORMATION SOURCE
Coal Quality	Lignite, average 6,680 Btu/lb. Sulfur 0.3 to 0.9%.		USGS
Coal Quantity	Recoverable - 420.6 million tons Reserves - average 40,300 ton/acre		USGS
Coal conservation and Maintenance of Production	90% recovery rate - New mine		USGS
Energy Production	End-use possible mine mouth gasification plant.	Net energy analysis 1 Btu expended for 178 Btus produced.	BLM, USGS
Likelihood of Leasing and Development	Depends on market forces. Two expressions of leasing interest.		BLM

IMPACTS TO THE NATURAL ENVIRONMENT

TRACT RANKING SUBFACTORS	PRESENT SITUATION	ANTICIPATED EFFECT OF LEASING/DEVELOPMENT	SIGNIFICANCE OF ANTICIPATED IMPACT
Air Quality	Excellent	Increase in total suspended particulates.	Insignificant
Minerals Other than Coal	Potential for oil and gas development.	Delay of exploration for oil and gas.	Significant
Water	Moderate chemical quality.	Decrease in the chemical quality of water passing through reclaimed soil.	Insignificant
Wildlife	Essential mule deer winter range and migration corridor on east side of tract.	Habitat destroyed if not declared unsuitable. Significant poaching and disturbance.	Significant
Cultural Features	Inventory incomplete. Inventory under contract.	Unknown but potentially significant loss of knowledge	Significant
Amenity Values	Area not viewed from any major highways or towns. High aesthetic quality, low scenic value	Area is essentially not seen from any important vantage point	Insignificant
Special Management Areas/ Unique Resource Impacts	No wilderness, special management or ACEC's in area.	Precludes designation options for the future.	Insignificant
Other Land Use & Transportation	Activity is new to the area.	Displacement of agricultural use. Relocation or bypass of transportation and utilities.	Insignificant

TRACT RANKING SUBFACTORS	PRESENT SITUATION	ANTICIPATED EFFECT OF LEASING/DEVELOPMENT	SIGNIFICANCE OF ANTICIPATED IMPACT
Reclamation Potential	Approximately 17% of the tract has poor and 1% has unsuitable reconstruction potential	Salinity increases due to mixing of soil horizons.	Insignificant
Unsuitability Criteria	Buffer zones and cultural deferred to mine plan. Alluvial valley floors to OSM; federally listed endangered species, state listed endangered species, eagle nests, roost and concentration areas, falcon nesting sites, migratory birds, and state resident fish and wildlife need further study.	Not applicable	Not applicable
	SOCIAL AND ECONOMIC		
Economic Changes	Population and employment levels forecasted relatively stable through 2000 A.D. Regional income to increase moderately.	Glendive, Lambert, Savage, Circle and Fairview would experience population increases. Regional income will increase slightly.	Significant
Community Service Assessment	Most services adequate or barely adequate. Resident perception of problem areas include medical care, recreation/entertainment, roads/traffic in Dawson and Richland Counties.	One or more services would become inadequate in Glendive, Lambert, Savage, Circle and Fairview.	Significant
Public Attitudes	Generally support (conditionally) coal development in Dawson and Richland Counties.	Not Applicable	Not Applicable
Lifestyle and Social Structure	Most residents favor the informal, small town atmosphere.	Some slight deterioration of quality of life.	Significant
Agricultural Operations	There are 8,972 acres of existing cropped land. Irrigated lands are adjacent to bottomlands.	Average annual loss of 155 acres (4,402 bu. of wheat) excluding 4,070 acres of summer-fallow, Maximum loss/peak mining year=1,530 to 2,318 acres (43,452 to 67,620 bu. of wheat).	Significant
Consistency with other Plans and Policies	BLM - Management Framework Plan of 1979.	Not Applicable	Not Applicable

CENTRAL BLOOMFIELD

The Central Bloomfield tract is approximately six miles north of Bloomfield and ten miles south of Richey, in northern Dawson County, Montana. Land in that area is used primarily for farming and ranching.

The tract contains 7 percent (105 million tons) of the federal coal under current consideration in the Fort Union Region. The one economically recoverable seam of lignite coal in the tract ranges in thickness from 14 to 30 feet. Overburden is between 150 and 200 feet thick. The generic mining plan calls for a surface mine using draglines, electric shovels, bottom-dump coal haulers, scrapers, and other support equipment. An on-site electrical generation plant would burn the coal.

The tract contains two inactive small mines which closed down in 1968. The nearest active mine is the Savage mine, 20 miles east of the tract. The tract lies on the western flank of the Williston Basin where oil and gas exploration, discovery, and production are increasing. The tract contains no producing wells.

The rolling terrain is typical of the tract where farming and ranching are the predominant uses.

SITE-SPECIFIC ANALYSIS

Minerals

Because the tract is located in the Williston basin, it has a potential for oil and gas development. Coal mining and associated operations preclude or inhibit certain phases of oil and gas exploration. Coal mining could delay exploration activities for six to eight years or even for the entire productive life of the mine.

Wildlife

Mining would reduce the available winter forage, causing a redistribution of wintering white-tailed deer to other lands south of the tract. Upwards of 50 white-tailed deer were found feeding on haystacks during the winter inventory of 1976-77 (Martin, 1981). Damage to haystacks could result if the whitetail concentrate south of the tract. This could be significant to individual operators.

Mining would remove approximately 2,486 acres of important mule deer winter habitat. This tract includes a narrow corridor that connects 122 square miles of essential winter range to summer range. Mining in these areas would cut off about two square miles in the northern part of this corridor and force deer onto flat, less secure habitat, where they would be more vulnerable to hunting and poaching.

Destruction of the habitat would cause some reduction in the numbers of animals in the herd and consequently reduce hunting opportunities in the area. This would be a long-term irreversible impact.

Cultural

Information on cultural resource values in the area is scarce. The tract could contain significant archaeological or historical sites and/or artifacts. Loss of these resources (due to mining) can be considered significant, unless more information is collected to indicate otherwise. Inventory being contracted now would raise the level of confidence that loss would or would not occur. The loss of identified values, if any exist, would be long-term and irreversible.

Reclamation

Intermixing of calcareous horizons would increase the salinity of the soil and make reestablishment of vegetation more difficult. Special handling of overburden, which would increase coal extraction costs, may be required. More information is required, and the salinity problem should be resolved in the mining plan.

Economic and Social

Construction and operation of a mine in the Central Bloomfield tract would result in significant impacts upon services in some Montana communities. Lambert, Sidney, Savage, Fairview, and Glendive would experience significant increases in both population and employment.

Peak employment during the construction phase of the Central Bloomfield mine is expected to occur in 1986 at 205 employees, with full operations employment expected in 1989 at 290 employees. The communities of Lambert, Sidney, Savage, Glendive, and Fairview predictably would experience an inadequate level of one or more community services as a direct result of the 1986 peak construction employment/population

levels. Glendive's water supply, for example, would be inadequate. Richey, Lindsay, Bloomfield, and West Glendive would experience an inadequate level of some community services by 1986 even without development. A mine-related population influx would cause these services to fall behind even further in meeting the needs of the communities.

Full operation of the Central Bloomfield mine (1989 and beyond) is also expected to result in serious impacts to community services. Sidney, Savage, Fairview, and Lambert would all have one or more public services that would be inadequate as a direct result of the population influx resulting from mine operation. Fairview, for example, would have inadequate fire protection and planning services; the sewage treatment facility in Fairview would be inadequate even without development. Similar situations are expected to occur in the remaining three communities. Several other communities in the area would experience severe problems in providing adequate services by 1989 even without tract development. Glendive, Richey, Lindsay, Bloomfield, and West Glendive would all be facing inadequacy of several services by 1991; the inadequacies would be further worsened by tract development.

Richland and Dawson counties are fairly diverse socially and economically. Both counties have either stable or growing populations. Sidney itself has had considerable exposure to population growth due to recent oil activities. It appears that the communities would be relatively well equipped to deal with population growth over the short-term.

Development of the tract would result in roughly 300 to 400 more people in both Sidney and Glendive-West Glendive than would normally reside there during the next 20 years. In terms of the political, religious, and family structures of these two areas, relatively smooth absorption of population could be expected. Lambert and Fairview would also be affected at a minimal level since the number of incoming residents is projected to be quite low.

Since development of the tract would result in population levels somewhat higher than would exist without development, it is likely that local residents would notice a change in the social atmosphere so strongly endorsed by existing residents in a BLM random sample survey. This change would likely be noticeable but not particularly significant in Sidney and Glendive-West Glendive. The higher population base could attract businesses providing retail opportunities and entertainment. Some residents now list these as shortcomings to living in the area.

Agriculture

Developing the coal in the Central Bloomfield tract would have a significant short-term impact on individual agricultural operations in the area. By the end of the mine life, 8,213 acres of the tract would have been disturbed, and 160 additional surface acres would be used for mine facilities.

An average of 74 acres of cropland, excluding summer fallow, would be removed from production each year, resulting in an average annual loss of 2,102 bushels of wheat. This cropland would be out of production ten to fifteen years, with a maximum of 739 to 1,123 acres out of production in any one peak mining year. The total loss would range from 20,988 to 31,893 bushels of wheat.

Peak mining year disturbance of 61 acres of hayland would result in an annual loss of 61 tons of hay production.

An average of 64 acres of rangeland would be removed from production each year, resulting in an average loss of 12 AUMs (animal unit months). This rangeland would be out of production ten to fifteen years, with a maximum of 645 to 981 acres out of production in any one peak mining year. The total loss would range from 126 to 191 AUMs.

Agricultural production on the tract averages from 21 to 23 percent of the combined total production of all 16 grain and livestock operations. The lone exception is hay production, with only 5 percent produced on the tract.

Regionally these losses would not pose significant reductions in area agricultural production; however, impacts to individual operators could be severe.

View is looking north into tract.

FACILITY ANALYSIS

The coal mined from the tract would probably be used in an electric power generating plant located near the mine.

Agriculture

Approximately 600 acres for the facility site would be taken out of agricultural production. In a worst-case

analysis, 8,520 bushels of wheat would be lost annually during the life of the power plant (based on current land use distribution).

A short-term disruption of 12 acres per mile would result during construction of an undetermined length of water pipeline. Roadways would disturb 14.5 acres per mile. A railroad spur would eliminate agriculture on 18 acres per mile for the entire life of the facility.

Potential negative impacts to vegetation and to livestock downwind from a coal-fired power plant exist due to nitrogen oxides, sulfur dioxide and particulate matter (West-Central North Dakota Regional Environmental Impact Study on Energy Development, 1978). Such negative impacts would be analyzed in detail by the state permitting authorities during their review of facility permit applications.

Water

Water requirements for an electric power facility are approximately 13,000 acre-feet per year. The likely source of water would be Fort Peck Reservoir. Present regulations require state approval of disposal sites for facility wastes of ash, sludge, and water.

Recreation

Recreation facilities in the region (community camping and picnic areas, Fort Peck Reservoir, and Charles M. Russell National Wildlife Refuge) are expected to receive the majority of recreation demand from the projected increased population. The social attitude survey revealed a concern for existing recreation facilities. It was also stated that an increase in population might result in the upgrading of already marginal recreation facilities.

Wildlife

Wildlife impacts associated with the power plant occur in two areas: 1) impacts from destruction of habitat and 2) impacts from the increase in human population. The removal of vegetation for a 600-acre electric power facility and the expansion of urban areas, highways, and railroads would prevent or reduce the use of an area by wildlife regardless of the type of vegetation removed. An area south of the tract is essential white-tailed deer habitat, and there is essential mule deer winter range west of the tract. Wildlife inventories should be completed in October 1981.

Powerlines, pipelines, and access roads could be constructed in key wildlife areas with partial or total destruction of habitat. Other anticipated impacts include eagle electrocutions on powerlines, migratory bird deaths from striking powerlines close to wetlands, road kills along transportation routes through wildlife areas, harassment of wildlife by off-road vehicle use, and increased poaching. These impacts, along with habitat destruction, would result in decreased wildlife populations in the area. Wildlife oriented recreation such as hunting and observation would have to be sought elsewhere.

Poaching and road kills have increased dramatically in areas of North Dakota, Montana, Wyoming, and Colorado where energy development has occurred. The problem is compounded where transportation corridors are located in important wildlife areas and when employee shift changes coincide with wildlife feeding periods. This situation could occur in the tract area.

Taking water from shallow bays in Fort Peck Reservoir could have significant adverse impacts. These areas are prime nursery and spawning areas for sport, commercial, and forage fish. Removal of water would include removal of young fish and eggs.

Aesthetics

The visual impact would be the pentration of the skyline by the facility, as seen from communities and major transportation corridors. The 600-foot stack could potentially be seen thirty or more miles away and would evoke a response either positive or negative. The dominance of the facility in the landscape could be perceived as a loss of amenity through impairment of the landscape for the 40 years of the expected life of the plant.

Economic and Social

Construction and operation of the power plant would result in impacts upon services in some communities. Sidney, Circle, Fairview, Lambert, and Savage would experience increases in both population and employment.

Peak employment during the construction phase is expected to occur in 1987 at 1248 employees, with full operations employment expected in 1993 at 200 employees. The communities of Sidney, Circle, Fairview, Lambert, and Savage would experience an inadequate level of one or more community services as a direct result of the 1987 peak construction employment/population levels. Sidney, for example, would have inadequate fire protection. Richey would experience an inadequate level of some community services by 1987 even without development. A facility-related population influx in Richey would thus worsen an inadequate service situation.

Full operation of the Central Bloomfield facility (1993 and beyond) is also expected to result in impacts to community services. Lambert, Savage, and Fairview would experience inadequate services due to the population influx associated with facility operation. Sidney, Richey, and Circle are forecasted to face inadequate public services by 1991 even without tract development. Development of the facility would further worsen

an inadequate service situation in these communities.

Residents in Richland and Dawson counties, where the most significant impact of the proposed plant would occur, generally expressed support for the construction of coal conversion facilities in the area. Just over two-thirds of the persons (in a random sample) interviewed by BLM representatives expressed support for the construction and operation of such a facility in their area. However, there was widespread concern about potential changes in local air quality. This emerged as the strongest concern among those residents who were interviewed.

Present and future residents of Richland and Dawson counties would be variably affected by the construction and operation of the power plant. Some persons would be in a position to take advantage of the increased employment opportunities and general economic activity that would result from such a siting. These would include persons outside the labor force but who are seeking work, persons with (or capable of acquiring) skills needed in industrialization, and business persons in Richland and Dawson communities, particularly Glendive-West Glendive and Sidney. Some persons residing in the area would not be able to participate in the economic benefits.

According to many of those contacted in the survey, the best thing about living in Dawson and Richland counties is the small town, informal, quiet social atmosphere that presently exists. Construction of the Central Bloomfield facility would result in this social atmosphere being substantially altered. These changes would be most significant during the construction phase. Upon completion of construction, it would be expected that residents' satisfaction with their communities as a place to live would be very similar to what would exist in the future without such development.

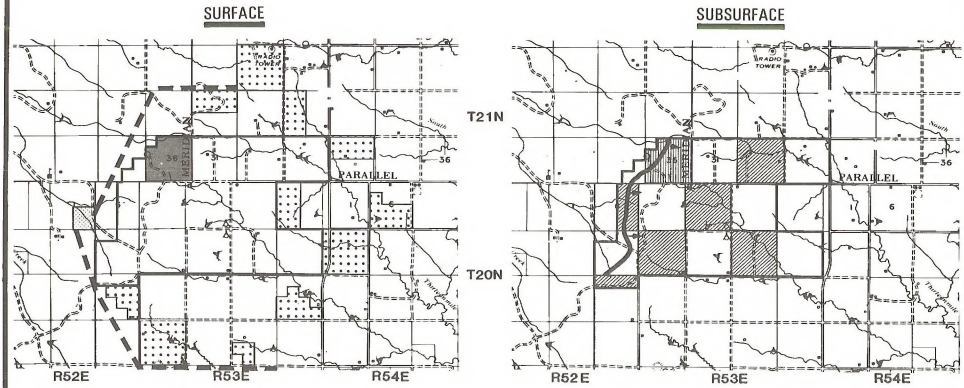
Dawson and Richland counties, and their primary centers, Glendive-West Glendive and Sidney, are in a fairly strong position to deal with rapid population growth. The communities and community leadership have, to some extent, already experienced growth management problems related to oil and gas development. These communities are relatively large in population and fairly diverse, both economically and socially. Construction of the plant would clearly result in construction phase population growth involving very significant administrative problems. However, if local officials are able to deal successfully with rapid growth over a short-term period, the communities' long-term stability would be established during the operations phase. The most fundamental and, to residents, noticeable changes in these communities would occur during the construction phase, when the level of population growth would present problems for residents. It is unlikely that these problems would persist beyond construction.

Air Quality

Probable impacts to air quality were analyzed to predict compliance or noncompliance with Ambient Air Quality Standards and Prevention of Significant Deterioration (PSD) Standards for Class I and Class II areas.

With the use of a screening dispersion model for emissions from an electric power facility sited on the Central Bloomfield tract, it has been forecast that the facility would not violate Montana or North Dakota Ambient Air Quality Standards and would not violate PSD Standards for Class I and Class II areas. The increased concentration levels for TSP, NOx, and SO_2 resulting from the facility were forecast to be below the detectable level at the border of the Class I area of the Theodore Roosevelt National Park in North Dakota.

CENTRAL BLOOMFIELD TRACT



CENTRAL BLOOMFIELD
SITE-SPECIFIC SUMMARY MATRIX

COAL ECONOMICS

TRACT RANKING SUBFACTORS	PRESENT SITUATION	COMMENTS	INFORMATION SOURCE
COAL ECONOMICS			
Coal Quality	6,110 to 8,700 Btus/lb. Average 6,698 Btus for lignite. Sulfur 0.3 to 1.5%.		USGS
Coal Quantity	Recoverable - 260.3 million tons Reserves - average 38,700 ton/acre		USGS
Coal conservation and Maintenance of Production	90% recovery rate - New mine		USGS
Energy Production	Possible end-use mine mouth power plant.	Net energy analysis 1 Btu expended for 178 Btus produced.	BLM, USGS
Likelihood of Leasing and Development	Depends on market forces. Two expressions of leasing interest.		BLM

IMPACTS TO THE NATURAL ENVIRONMENT

TRACT RANKING SUBFACTORS	PRESENT SITUATION	ANTICIPATED EFFECT OF LEASING/DEVELOPMENT	SIGNIFICANCE OF ANTICIPATED IMPACT
Air Quality	Excellent	Increase in total suspended particulates.	Insignificant
Minerals Other than Coal	Potential for oil and gas development.	Delay of exploration for oil and gas within the tract.	Significant
Water	Moderate chemical quality.	Decrease in the chemical quality of water passing through reclaimed soils.	Insignificant
Wildlife	Essential mule deer winter range and migration corridor on east side of tract.	Habitat destroyed if not declared unsuitable. Significant poaching and disturbance.	Significant
Cultural Features	Inventory incomplete. Inventory under contract.	Unknown but potentially significant loss of knowledge	Significant
Amenity Values	Area not viewed from any major highways or towns. High aesthetic quality, low scenic value.	Area is essentially not seen from any important vantage point	Insignificant
Special Management Areas/ Unique Resource Impacts	No wilderness, special management or ACEC's in area.	Precludes designation options for the future.	Insignificant

TRACT RANKING SUBFACTORS	PRESENT SITUATION	ANTICIPATED EFFECT OF LEASING/DEVELOPMENT	SIGNIFICANCE OF ANTICIPATED IMPACT
Other Land Use & Transportation	Activity is new to the area.	Displacement of agricultural use. Relocation or bypass of transportation and utilities.	Insignificant
Reclamation Potential	Approximately 26 of the tract has poor and 2% has unsuitable reconstruction potential.	Salinity increases due to mixing of soil horizons.	Insignificant
Unsuitability Criteria	Buffered zones and cultural deferred to mine plan. Alluvial valley floors to OSM; Federally listed endangered species, state listed endangered species, eagle nests, roost and concentration areas, falcon nesting sites, migratory birds, and state resident fish and wildlife need further study.	Not applicable	Not applicable
	SOCIAL AND ECONOMIC		
Economic Changes	Population and employment levels forecasted relatively stable through 2000 A.D. Regional income to increase moderately.	Glendive, Lambert, Savage, Circle and Fairview would experience population incrases. Regional income will increase slightly.	Significant
Community Service Assessment	Most services adequate or barely adequate. Resident perception of problem areas include medical care, recreation/entertainment roads/traffic in Dawson and Richland Counties.	One or more services would become inadequate in Glendive, Lambert, Savage, Circle and Fairview.	Significant
Public Attitudes	Generally support (conditionally) coal development in Dawson and Richland Counties.	Not Applicable	Not Applicable
Lifestyle and Social Structure	Most residents favor the informal, small town atmosphere.	Some slight deterioration of quality of life.	Significant
Agricultural Operations	There are 5,570 acres of existing cropped land. Irrigated lands are adjacent to bottomlands.	Average annual loss of 79 acres (2,102 bu. of wheat) excluding 2,554 acres of summer-fallow, Maximum loss/peak mining year=739 to 1,123 acres (20,988 to 31,893 bu. of wheat).	Significant
Consistency with other Plans and Policies	BLM - Management Framework Plan of 1979.	Not Applicable	Not Applicable

BURNS CREEK

The Burns Creek tract is approximately 18 miles southwest of Savage, in Dawson County, Montana. The land is primarily used for farming and ranching.

The tract contains about 2 percent (31.1 million tons) of the federal coal under current consideration in the Fort Union Region. The tract has one economically recoverable seam of lignite coal, which averages 35 feet thick. Overburden averages 118 feet in thickness.

The generic mining plan calls for a surface mine using draglines, electric shovels, bottom-dump coal haulers, scrapers, and other support equipment. An indirect liquefaction facility would likely use the mined coal.

The tract contains one inactive mine. The nearest active mine is the Savage mine, 6 miles northeast of the tract. The tract lies on the western flank of the Williston Basin, where oil and gas exploration, discovery, and production are increasing. The tract contains no producing oil or gas wells.

Woody draws are critical habitat for wildlife on the tract.

SITE SPECIFIC ANALYSIS

Minerals

Because the tract is located in the Williston Basin, it has a potential for oil and gas development. Coal mining and associated operations preclude or inhibit certain phases of oil and gas exploration. Coal mining could delay exploration activities for six to eight years or even for the entire life of the mine.

Wildlife

Destruction of any woody draws would be a significant impact to the wildlife species on the tract, especially sharp-tailed grouse. There would be short-term impacts from disturbance during mining and reclamation. Poaching and road kills have increased dramatically in areas of Montana, Wyoming, and Colorado where energy development has occurred the same could be expected on this tract. A decline of water quality in the area would be adverse to preserving the diversity of fish species in the tract drainages.

Cultural

Information on cultural resource values in the area is scarce. The tract could contain significant archaeological or historical sites and/or artifacts. Loss of these cultural resources (due to mining) can be considered significant, unless more information is collected to indicate otherwise. Inventory being contracted now would raise the level of confidence that loss would or would not occur. The loss of identified values, if any exist, would be long-term and irreversible.

Reclamation

Intermixing of calcareous horizons would increase the salinity of the soil and make reestablishment of vegetation more difficult. Special handling of overburden, which would increase coal extraction costs, may be required. More information is required, and the salinity problem should be resolved in the mining plan.

Economic and Social

Construction and operation of a mine in the Burns Creek tract would result in impacts upon services in some communities. Glendive, Circle, Sidney, Savage, Fairview, and Lambert, Montana would experience increases in both population and employment.

Peak employment during the construction phase of the Burns Creek mine is expected to occur in 1986 at 260 employees, with full operations employment expected in 1991 at 440 employees. The communities of Glendive, Circle, Sidney, Savage, Fairview, and Lambert would probably experience an inadequate level of one or more community services as a direct result of the 1986 peak construction employment/population levels. Glendive, for example, would have an inadequate water supply as a result of population growth attributable to the construction of the Burns Creek mine. Bloomfield, Richey, Lindsay, and West Glendive would have some inadequate community services by 1986, even without mine development. A mine-related population influx in these communities would cause these services to fall even further behind in meeting the needs of the residents.

Full operation of the mine (1991 and beyond) is also expected to result in serious impacts to community services. Sidney, Savage, Fairview, and Lambert would all have one or more public services which would be

inadequate due to the population influx associated with mine operation. Fairview, for example, would have inadequate fire protection and planning services, while the sewage treatment facilities in Fairview would be inadequate even without development. Richey, Glendive, West Glendive, Circle, Lindsay, and Bloomfield all would find themselves with some inadequate public services by 1991, even without mine development. Development of the Burns Creek mine would cause these services to fall even further behind in meeting the needs of the communities.

Agriculture

Development would have a significant short-term impact on individual agricultural operations in the tract. By the end of the mine life, 16,330 acres of the tract would have been disturbed, and 160 additional acres would be used for mine facilities.

An average of 24 acres of cropland, excluding summer fallow, would be removed from production each year. This cropland would be out of production ten to fifteen years, with a maximum of 239 to 364 acres out of production in any one peak mining year. The maximum loss would range from 6,788 to 10,338 bushels of wheat annually.

Peak mining year disturbance of 227 acres of hayland would result in an annual loss of 227 tons of hay production.

An average of 363 acres of rangeland would be taken out of production each year, resulting in an average loss of 71 AUMs (animal unit months). This rangeland would be out of production ten to fifteen years, with a maximum of 3,650 to 5,548 acres out of production in any one peak mining year. The maximum annual loss would range from 712 to 1,082 AUMs.

Regionally, these losses would not significantly reduce agricultural production, but some individual operators would be severely impacted to the extent that they may be forced out of farming or ranching.

An average of 363 acres of rangeland would be taken out of production each year.

FACILITY ANALYSIS

The coal mined from the tract would be used in an indirect liquefaction plant located near the mine.

Agriculture

Approximately 960 acres for the facility site would be taken out of agricultural production. In a worst-case analysis, 13,632 bushels of wheat would be lost annually during the life of the liquefaction plant (based on current land use). A short-term disruption of 12 acres per mile would result during construction of an undetermined length of water pipeline. Roadways would disturb 14.5 acres per mile. A railroad spur would eliminate agriculture on 18 acres per mile for the entire life of the facility.

Potential negative impacts to vegetation and to livestock exist downwind from coal conversion facilities due to nitrogen oxides, sulfur dioxide, and particulate matter (West-Central North Dakota Regional Environmental Impact Study on Energy Development, 1978). These negative impacts would be analyzed in detail by the state permitting authorities during their review of facility permit applications.

Water

Water requirements for an indirect liquefaction plant are approximately 11,500 acre-feet per year. Fort Peck Reservoir would be the most likely source of water for the plant. Present regulations require state approval of disposal sites for facility wastes of ash, sludge, and water.

Recreation

Recreation facilities in the region (community camping and picnic areas, Fort Peck Reservoir, and Charles M. Russell National Wildlife Refuge) probably would receive the bulk of recreation demand from the projected increased population. The social attitude survey revealed a concern for existing recreation facilities. It was also stated that an increase in population might result in the upgrading of already marginal recreation facilities.

Wildlife

Wildlife impacts associated with the indirect liquefaction plant occur in two areas: 1) impacts from destruction of habitat and 2) impacts from the increase in human population. The removal of vegetation for a 960-acre indirect liquefaction facility and the expansion of urban areas, highways, and railroads would prevent or reduce the use of an area by wildlife regardless of the type of vegetation removed. Most surface landowners

in the tract would not allow BLM biologists on the land to conduct inventories. However, it is known that the area around the tract contains numerous woody draws which provide excellent wildlife habitat.

Powerlines, pipelines, and access roads could be constructed in key wildlife areas with partial or total destruction of habitat. Other anticipated impacts include eagle electrocution on powerlines, migratory bird deaths from striking powerlines close to wetlands, road kills along transportation routes through wildlife areas, harassment of wildlife by off-road vehicle use, and increased poaching. These impacts, along with habitat destruction, would result in decreased wildlife populations in the area. Wildlife oriented recreation such as hunting and observation would have to be sought elsewhere.

Poaching and road kills have increased dramatically in areas of North Dakota, Montana, Wyoming, and Colorado where energy development has occurred. The problem is compounded where transportation corridors pass through wildlife areas and when employee shift changes coincide with wildlife feeding periods. This situation could occur in the tract area.

Taking water from shallow bays in Fort Peck Reservoir could have significant adverse impacts. These areas are prime nursery and spawning areas for sport, commercial, and forage fish. Eggs and young fish would be removed from the bays along with the water.

Aesthetics

The visual impact would be the penetration of the skyline by the facility, as seen from communities and major transportation corridors. The 500-foot stack could potentially be seen thirty or more miles away and would elicit a response either positive or negative. The dominance of the facility in the landscape could be perceived as a loss of amenity through impairment of the landscape for the 40 years of the expected life of the plant.

Economic and Social

Construction and operation of the liquefaction plant would result in impacts upon services in some communities. Glendive, Circle, Sidney, Lambert, Savage, and Fairview would experience increases in both population and employment as a result of development.

Peak employment during the construction phase is expected to occur in 1987 at 2,617 employees, with full operations employment expected in 1993 at 900 employees. By 1987, Circle, Sidney, Glendive, Fairview, Lambert, and Savage would probably experience an inadequate level of one or more community services as a direct result of construction employment/population levels. Glendive, for example, would have inadequate police protection, sewage collection and treatment facilities, and water supply and distribution systems as a result of population growth.

Full operation of the facility (1993 and beyond) is also expected to result in impacts to community services. Sidney, Lambert, Savage, and Fairview would experience inadequate services due to the population influx associated with facility operation. West Glendive, Richey, Lindsay, Glendive, Circle, and Bloomfield are forecasted to face inadequate public services by 1991, even without tract development. Development of the facility would further worsen inadequate service situations in these communities.

Residents in Richland and Dawson counties, where the impacts of a Burns Creek plant would be concentrated, expressed a high level of support for a local coal conversion facility when contacted by BLM representatives in a random sample survey. Roughly two-thirds of the persons interviewed were supportive, either with or without any sort of qualification. Roughly one-fourth of the persons opposed tended to be firmer in their expressed position than the proponents. Independent of the attitudes expressed toward coal conversion facilities, air quality emerged as the major concern in the area. This was the most prevalent issue brought up by the sixty-eight persons interviewed in the two-county area.

Some present and future residents of Richland and Dawson counties (particularly of Glendive-West Glendive, and Sidney) would be in a position to take advantage of the benefits of the Burns Creek facility, while others would not. Those who would benefit economically from the project include local merchants, persons who have or acquire industrial job skills, and persons outside the labor force who are looking for work. Example of this final group of persons would be females seeking full- or part-time employment but unable to acquire such a job without coal development.

During the construction phase of the Burns Creek plant, the social environments in Dawson and Richland counties, and particularly the communities of Glendive-West Glendive, and Sidney, would probably be rapidly changing, less predictable, and noisier. The changes would create anxiety in many residents. Since it appears that the small town way of life is an element of great appeal to many residents, there would be some deterioration in many residents' satisfaction with their communities. This would be noticeably pronounced during the construction period. During the operation phase, the affected communities would return to conditions similar to those which would exist without development. The long-term changes created by the Burns Creek plant would not be significant.

Dealing with the rapid growth of the construction phase of the Burns Creek facility would be difficult in Richland and Dawson counties. Population growth rates are of sufficient scale to cause short-term disruptions in the family, political, leisure, and occupational systems. However, both Dawson and Richland counties, and the urban centers of Glendive-West Glendive and Sidney, are fairly diverse economically and socially, are rela-

tively large in population (as compared to other potential energy impact locations) and have had some experience with rapid industrialization (primarily oil and gas activity). The communities' experience, through their respective leadership groups, in dealing with such changes and administrative pressures would be a major asset to these areas should the Burns Creek plant be built.

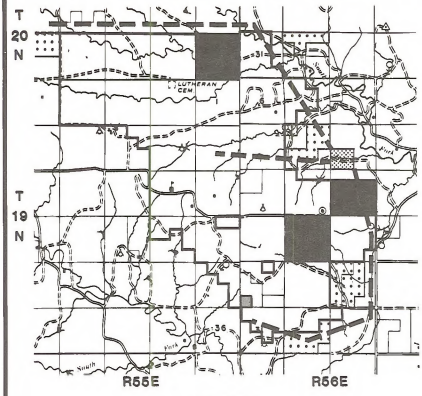
Sidney, Fairview, West Glendive, Glendive, and Richey are not as vulnerable as many other communities would be. Their capacity to manage and absorb rapid changes during the construction phase is substantial. This does not mean that service, facility, and social structural problems would be absent; they would be noticeable, and for residents, very stressful. However, once the construction phase of the Burns Creek plant is completed, long-term stability and predictability should become reestablished.

Air Quality

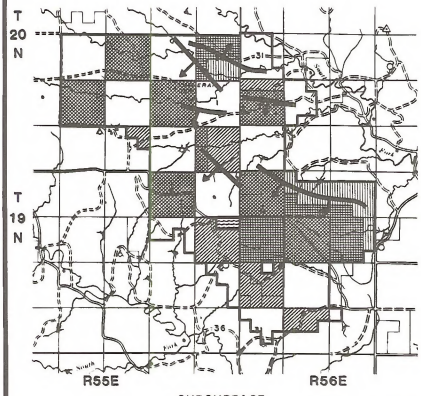
Probable impacts to air quality were analyzed to predict compliance or noncompliance with Ambient Air Quality Standards and Prevention of Significant Deterioration (PSD) Standards for Class I and Class II areas.

With the use of a screening dispersion model for emissions from an indirect liquefaction facility sited on the Burns Creek tract, it has been forecast that the facility would not violate Montana and North Dakota Ambient Air Quality Standards and would not violate the PSD Standards for Class I and Class II areas. The increased concentration levels for TSP, NOx, and SO_2 resulting from the facility were forecast to be below the detectable level at the border of the Class I area of the Theodore Roosevelt National Park in North Dakota.

BURNS CREEK TRACT



SURFACE



SUBSURFACE

LEGEND

- Federal Surface
- State Surface
- Private Surface
- Surface Owner Nonconsents
- Tract Boundary
- Federal Coal
- State Coal
- Private Coal
- Federal Coal Lease
- State Coal Lease
- Bypass
- Surface Facilities
- Out-of-Pit Haul Roads
- Pit Advancement

-N-

0 1 2 3 4 5 6

Scale In Miles

BURNS CREEK
SITE-SPECIFIC SUMMARY MATRIX

COAL ECONOMICS

TRACT RANKING SUBFACTORS	PRESENT SITUATION	COMMENTS	INFORMATION SOURCE
Coal Quality	4,920 to 8,590 Btu's. Lignite, average 6,750 Btu/lb. Sulfur 0.3 to 1.6%. Average 0.7%.		USGS
Coal Quantity	Recoverable - 535.8 million tons Reserves - average 59,200 ton/acre		USGS
Coal conservation and Maintenance of Production	90% recovery rate - New mine if developed.		USGS
Energy Production	End-use possible mine mouth liquefaction plant.	Net energy analysis 1 Btu expended for 179 Btus produced.	BLM, USGS
Likelihood of Leasing and Development	Much of the federal coal has been leased. Three expressions of leasing interest. Depends on market driven forces.		BLM

IMPACTS TO THE NATURAL ENVIRONMENT

TRACT RANKING SUBFACTORS	PRESENT SITUATION	ANTICIPATED EFFECT OF LEASING/DEVELOPMENT	SIGNIFICANCE OF ANTICIPATED IMPACT
Air Quality	Excellent	Increase in total suspended particulates.	Insignificant
Minerals Other than Coal	Potential for oil and gas development.	Delay of exploration for oil and gas within the tract.	Significant
Water	Moderate chemical quality.	Decrease in the chemical quality of water passing through reclaimed soil.	Insignificant
Wildlife	Landowners won't allow wildlife inventory.	Unknown plus increased poaching and disturbance.	Significant
Cultural Features	Inventory incomplete. Inventory under contract.	Unknown but potentially significant loss of knowledge	Significant
Amenity Values	Little of the tract is seen from any major highways. High aesthetic quality, low scenic value	Views are intermittant and of short duration. Activity would be essentially unseen.	Insignificant
Special Management Areas/ Unique Resource Impacts	No wilderness, special management areas or ACEC's.	Precludes designation options for the future.	Insignificant
Other Land Use & Transportation	Activity is new to the area.	Displacement of agricultural use. Relocation or bypass of transportation and utilities.	Insignificant

TRACT RANKING SUBFACTORS	PRESENT SITUATION	ANTICIPATED EFFECT OF LEASING/DEVELOPMENT	SIGNIFICANCE OF ANTICIPATED IMPACT
Reclamation Potential	Approximately 62% of the tract has poor reconstruction potential	Salinity increases due to mixing of soil horizons.	Significant
Unsuitability Criteria	Buffer zones and cultural deferred to mine plan. Alluvial valley floors to OSM; federal and state listed endangered species, eagle nests, roost and concentration areas, falcon nesting areas, migratory birds, and state resident fish and wildlife need further study.	Not applicable	Not applicable
	SOCIAL AND ECONOMIC		
Economic Changes	Population and employment levels forecasted relatively stable through 2000 A.D. Regional income to increase moderately.	Glendive, Circle, Sidney, Savage, Fairview, and Lambert would experience population increases. Regional income would increase slightly.	Significant
Community Service Assessment	Most services adequate or barely adequate. Resident perception of problem areas include: traffic, roads, medical, recreation/ entertainment.	One or more services would become inadequate in Glendive, Lambert, Savage, Circle, Fairview, and Sidney.	Significant
Public Attitudes	Generally support (conditionally) coal development in McCone, Dawson and Richland Counties.	Not Applicable	Not Applicable
Lifestyle and Social Structure	Most residents favor the informal, small town atmosphere.	Some slight deterioration of quality of life.	Significant
Agricultural Operations	There are 1,717 acres of existing cropped land. Irrigated lands are adjacent to bottomlands.	Average annual loss of 24 acres (682 bu. of wheat) excluding 533 acres of summer-fallow, Maximum loss/peak mining year=239 to 364 (6,788 to 10,388 bu. of wheat).	Significant
Consistency with other Plans and Policies	BLM - Management Framework Plan of 1979.	Not Applicable	Not Applicable

CIRCLE WEST I

The Circle West I tract is approximately 20 miles west of Circle in McCone County, Montana. The land is used primarily for farming and ranching.

The tract contains about six percent (86 million tons) of the federal coal under current consideration in the Fort Union Region. The economically recoverable seam of lignite coal in the tract averages 26.5 feet thick, with overburden ranging from less than 150 to 200 feet in depth.

The generic mining plan calls for a surface mine using draglines, electric shovels, bottom-dump coal haulers, scrapers, and other support equipment. An on-site electrical generation plant would likely burn the mined coal.

The nearest active mine is the Savage mine, which is 80 miles east of the tract. The tract lies on the western flank of the Williston Basin, where oil and gas exploration, discovery, and production are increasing. The tract contains no producing wells.

Rangeland would be removed from production with a maximum annual loss from 645 to 980 AUMs.

SITE SPECIFIC ANALYSIS

Minerals

Because the tract is in the Williston Basin, it has a potential for oil and gas development. Coal mining and associated operations preclude or inhibit certain phases of oil and gas exploration. Coal mining could delay exploration activities for six to eight years, or even for the entire productive life of the mine.

Wildlife

A significant portion of a regional pronghorn population reproduce and winter in the south part of the tract. Habitat destruction, increased poaching, and increased human disturbance (all mining-related) would lead to destruction of the herd. This would be a long-term significant impact that would greatly reduce or eliminate antelope hunting in the area.

Cultural

Information on cultural resource values in the area is scarce. The tract could contain significant archaeological or historical sites and/or artifacts. Impacts to these potential resources can be considered significant, unless more information is collected to indicate otherwise. Inventory being contracted now would raise the level of confidence that loss would or would not occur. The loss of identified values, if any exist, would be permanent.

Reclamation

Intermixing of calcareous horizons would increase the salinity of the soil and make reestablishment of vegetation more difficult. Special handling of overburden, which would increase coal mining costs, may be required. The salinity problem should be resolved in the mining plan, after more information is gathered.

Economic and Social

Construction and operation of the Circle West I mine would result in significant impacts upon services in some communities. Circle, Lambert, Savage, and Glendive, Montana would experience significant increases in population and employment.

Peak employment during the construction phase of the mine is expected to occur in 1986 at 260 employees, with full operations employment expected in 1991 at 270 employees. Community planners believe Circle, Lambert, Savage, and Glendive would experience an inadequate level of one or more community services as a direct result of the peak construction employment/population levels. Richey, West Glendive, Fairview, Sidney, and Brockway would experience an inadequate level of some community services by 1986, even without tract development. A tract-related population influx in these communities would further worsen service inadequacies.

Full operation (1991 and beyond) of the mine is not expected to cause service inadequacies directly in any of the communities. All nine communities discussed above would experience inadequacy of several community services by 1991, even without tract development; thus, operation of the mine would simply add to the expected problems.

McCone County, particularly the community of Circle, would be strongly affected by development of the Circle

I tract. A population increase of 25 to 30 percent during the operations phase is substantial in a community that has an existing population of approximately 1,000 persons. Circle and McCone County are not economically diverse. Since there has been no energy development to date in the immediate area, community leaders and residents have had limited experience in coping with sudden population growth. For these reasons, the nature of the community in terms of social atmosphere likely would be changed significantly by development of the Circle I mine.

Agriculture

Development of the Circle West I mine would have a significant short-term impact on individual agricultural operations in the tract. By the end of the mine life, 9,859 acres of tract would have been disturbed, and 160 additional surface acres would be used for mine facilities.

An average of 7 acres of cropland, excluding summer fallow, would be removed from production each year. The cropland would be out of production ten to fifteen years, with a maximum of 70 to 107 acres out of production in any one peak mining year. The maximum annual loss would range from 1,988 to 3,039 bushels of wheat.

Peak mining year disturbance of 183 acres of hayland would result in a maximum annual loss of 183 tons of hay production.

An average of 231 acres of rangeland would also be removed from production each year, resulting in an average loss of 64 AUMs (animal unit months). This rangeland would be out of production ten to fifteen years, with a maximum of 2,327 to 3,537 acres out of production in any one peak mining year. The maximum annual loss would range from 645 to 980 AUMs.

Regionally, these losses would not significantly reduce agricultural production, but some individual operators would be severely impacted.

Ranching and farming are the predominant uses occurring on the tract.

FACILITY ANALYSIS

The coal mined from the tract would probably be used to fire an electric power generating plant located near the mine.

Agriculture

Approximately 600 acres for the facility site would be taken out of agricultural production. In a worst-case analysis, 8,526 bushels of wheat would be lost annually during the life of the power plant.

A short-term disruption of 12 acres per mile would result during construction of an undetermined length of water pipeline. Roadways would disturb 14.5 acres per mile. A railroad spur would eliminate agriculture on 18 acres per mile for the entire life of the facility.

Potential negative impacts to vegetation and to livestock exist downwind from coal conversion facilities due to nitrogen oxides, sulfur dioxide and particulate matter (West-Central North Dakota Regional Environmental Impact Study on Energy Development, 1978). Such negative impacts would be analyzed in detail by the state permitting authorities during their review of facility permit applications.

Water

Water requirements for an electric power facility are approximately 13,000 acre-feet per year. The likely source of this water would be Fort Peck Reservoir. Present regulations require state approval of disposal sites for facility wastes of ash, sludge, and water.

Recreation

Recreation facilities in the region (community camping and picnic areas, Fort Peck Reservoir, and Charles M. Russell National Wildlife Refuge) are expected to receive most of the recreation demand from the projected increased population. The social attitude survey revealed a concern for existing recreation facilities. It was also stated that an increase in population might result in the upgrading of currently marginal recreation facilities.

Wildlife

Wildlife impacts associated with the electric power facility could occur in two areas: 1) impacts from destruction of habitat and 2) impacts from the increase in human population. Removal of vegetation for a 600-acre facility and the expansion of urban areas, highways, and railroads would prevent or reduce the use of an area by wildlife, regardless of the type of vegetation removed. A large area south of the tract is essential antelope habitat. Golden eagle and prairie falcon nests

are situated nearby, west of the tract; and essential deer winter range lies east of the tract.

Powerlines, pipelines, and access roads could be constructed in key wildlife areas, with partial or total destruction of habitat. Other anticipated impacts include eagle electrocutions on powerlines, migratory bird deaths from striking powerlines close to wetlands, road kills along transportation routes through wildlife areas, harassment of wildlife by off-road vehicle use, and increased poaching. These impacts, along with habitat destruction, would result in decreased wildlife populations in the area. Wildlife oriented recreation such as hunting and observation would have to be sought elsewhere.

Poaching and road kills have increased dramatically in areas of North Dakota, Montana, Wyoming, and Colorado where energy development has occurred. The problem is compounded where transportation corridors cross wildlife areas and when employee shift changes coincide with wildlife feeding periods. This situation could occur in the tract area.

Taking water from shallow bays in Fort Peck Reservoir could have significant adverse impacts. These areas are prime nursery and spawning areas for sport, commercial, and forage fish. Removal of water would also involve removal of young fish and eggs.

Aesthetics

The visual impact would be the penetration of the skyline by the facility, as seen from communities and major transportation corridors. The highly visible 600-foot stack—which could be seen from thirty or more miles away—would elicit a response either positive or negative. The dominance of the facility in the landscape could be perceived as a loss of amenity through impairment of the landscape during the 40 years of the facility's expected life.

Economic and Social

Construction and operation of the power plant would result in impacts upon services in some communities. Savage, Lambert, Circle, and Brockway would experience increases in both population and employment.

Peak employment during the construction phase is expected to occur in 1987 at 1,248 employees, with full operations employment expected in 1993 at 200 employees. The above communities would experience an inadequate level of one or more community services as a direct result of the peak construction employment/population levels. Savage, for example, is forecasted to have inadequate police, social services, and public health facilities due to population growth associated with the construction of the facility. Sidney and Fairview would have some inadequate community services by 1987, even without facility development. A facility-related population influx in these towns would thus worsen service inadequacies.

Full operation of the power plant (1993 and beyond) is also expected to result in impacts to community services. Savage would have inadequate fire protection as a direct result of the population influx associated with facility operation. Fairview, Sidney, Lambert, Circle, and Brockway probably are expected to have inadequate public services by 1991 even without the power plant operation. Development of the plant would further worsen inadequate service situations in these communities.

A majority of the interviewed respondents (in a random sample survey done by BLM) in Dawson and McCone counties support the construction and operation of a coal conversion facility(s) in the area. Fifty-five residents in the two-county area were interviewed by BLM representatives, and roughly two-thirds of these persons expressed support for such a plant. While a significant number of persons qualified their support (e.g., their response was contingent upon maintenance of high air quality levels), the persons who opposed such facilities (about one-fourth of the sample) were typically unequivocal in their opposition.

If a power plant were built in or near the tract, there would be a variable distribution of benefits and losses within the area. Some persons would be unable to share in the benefits due to their lack of occupational skills, but others would financially benefit from such a facility. The beneficiaries would include persons who have marketable skills and persons who might not otherwise be employed, but who desire employment. Because Dawson County is more diverse, economically and socially, it is likely that a somewhat higher proportion of persons in Dawson County would be able to take advantage of such a facility than in McCone County.

Construction of the plant would have an effect on those area characteristics most strongly endorsed by residents. The rapid population growth attached to construction of a plant would result in a more segmented, more stressful social environment than presently exists. The existing level of social homogenity would be reduced. Persons who appreciate the relatively slow paced, informal, and personable social environment would perceive a reduced quality of life. This would be particularly noticeable during the construction phase of the project. Beyond that time, routine social relations would probably be reestablished and the social stresses of the construction phase would be reduced, if not eliminated.

Dawson County and the cities of Glendive and West Glendive appear to be in a much more favorable position to deal with rapid population growth than McCone County and the communities of Circle and Brockway. Dawson County is more economically and socially diverse, has a larger population base, has not expe-

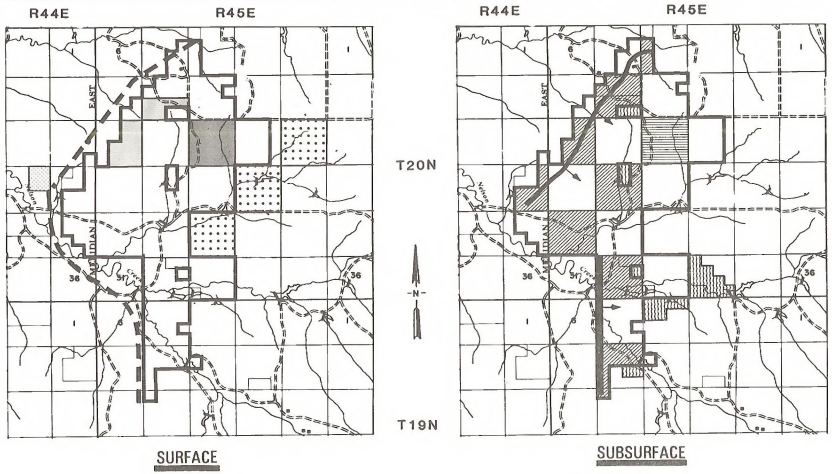
rienced the population losses of McCone County during the last several decades, and to some extent, has had experience with industrialization. For these reasons, the capacity of the communities in Dawson County and the county itself to absorb rapid growth and change is much greater than in McCone County.

During the construction of the power plant, the impact of rapid population growth in McCone County would likely be very signficant. Dawson County communities would likely be able to deal more successfully with such growth due to administrative and general population experience.

Air Quality

Probable impacts to air quality were analyzed to determine compliance or noncompliance with Ambient Air Quality Standards and Prevention of Significant Deterioration (PSD) Standards for Class I and Class II areas.

With the use of a screening dispersion model for emissions from an electric power facility sited on the tract, it has been forecast that the facility would not violate Montana or North Dakota Ambient Air Quality Standards and would not violate PSD Standards for Class I and Class II areas. The increased concentration levels for TSP, NOx, and SO_2 resulting from the facility were forecast to be below the detectable level at the border of the Class I area of the Theodore Roosevelt National Park in North Dakota.



CIRCLE WEST TRACT I

LEGEND

- Federal Surface
- State Surface
- Private Surface
- Surface Owner Nonconsents
- Tract Boundary
- Federal Coal
- State Coal
- Private Coal
- Bypasses
- Surface Facilities
- Out-of-Pit Haul Roads
- Pit Advancement

1 0 1 2 3 4 5 6

Scale In Miles

CIRCLE WEST I
SITE-SPECIFIC SUMMARY MATRIX

COAL ECONOMICS

TRACT RANKING SUBFACTORS	PRESENT SITUATION	COMMENTS	INFORMATION SOURCE
Coal Quality	Lignite, 7,400 to 7,520 Btus/lb. Sulfur 0.2 to 0.4%.		USGS
Coal Quantity	Recoverable - 216 million tons Reserves - average 28,900 ton/acre		USGS
Coal conservation and Maintenance of Production	90% recovery rate - New mine		USGS
Energy Production	End-use possible mine mouth power plant.	Net energy analysis 1 Btu expended for 198 Btus produced.	BLM, USGS
Likelihood of Leasing and Development	Depends on market driven forces. Three expressions of leasing interest received.		BLM

IMPACTS TO THE NATURAL ENVIRONMENT

TRACT RANKING SUBFACTORS	PRESENT SITUATION	ANTICIPATED EFFECT OF LEASING/DEVELOPMENT	SIGNIFICANCE OF ANTICIPATED IMPACT
Air Quality	Excellent	Increase in total suspended particulates.	Insignificant
Minerals Other than Coal	Potential for oil and gas development.	Delay of exploration for oil and gas within the tract.	Significant
Water	Moderate chemical quality.	Decrease in the chemical quality of water passing through reclaimed soils.	Insignificant
Wildlife	Essential pronghorn habitat on south end of tract.	Habitat destroyed if not declared unsuitable. Increased poaching and disturbance.	Significant
Cultural Features	Inventory incomplete. Inventory under contract.	Unknown but potentially significant loss of knowledge	Significant
Amenity Values	High aesthetic quality, low scenic value	Moderate to low visual changes in short-term. Slight changes in long-term.	Insignificant
Special Management Areas/ Unique Resource Impacts	No wilderness, special management or ACEC's in area.	Precludes designation options in the future.	Insignificant
Other Land Use & Transportation	Activity is new to the area.	Displacement of agricultural use short-term. Relocation or bypass of transportation and utilities.	Insignificant

TRACT RANKING SUBFACTORS	PRESENT SITUATION	ANTICIPATED EFFECT OF LEASING/DEVELOPMENT	SIGNIFICANCE OF ANTICIPATED IMPACT
Reclamation Potential	Approximately 57% of the tract has poor reconstruction potential	Salinity increases due to mixing of soil horizons.	Significant
Unsuitability Criteria	Buffer zones and cultural deferred to mine plan. Alluvial valley floors to OSM; federal and state listed endangered species, eagle nests, roost and concentration areas, falcon nesting sites, migratory birds, and state resident fish and wildlife need further study.	Not applicable	Not applicable
	SOCIAL AND ECONOMIC		
Economic Changes	Population and employment levels forecasted relatively stable through 2000 A.D. Regional income to increase moderately.	Glendive, Lambert, Savage, and Circle would experience population increases. Regional income will increase slightly.	Significant
Community Service Assessment	Most services adequate or barely adequate. Resident perception of problem areas include medical care, recreation/entertainment, and roads/traffic.	One or more services would become inadequate in Glendive, Lambert, Savage, and Circle.	Significant
Public Attitudes	Generally support (conditionally) coal development in Dawson and McCone Counties.	Not Applicable	Not Applicable
Lifestyle and Social Structure	Most residents favor the informal, small town atmosphere.	Some slight deterioration of quality of life in Glendive, Savage, and Lambert with significant deterioration in Circle.	Significant
Agricultural Operations	There are 551 acres of existing cropped land. Irrigated lands are adjacent to bottomlands.	Average annual loss of 7 acres (199 bu. of wheat) excluding 87 acres of summer-fallow, Maximum loss/peak mining year=70 to 107 acres (1,988 to 3,039 bu. of wheat).	Significant
Consistency with other Plans and Policies	BLM - Management Framework Plan of 1979.	Not Applicable	Not Applicable

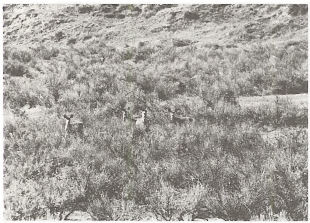
CIRCLE WEST II

The Circle West II tract is approximately 20 miles west of Circle, in McCone County, Montana. The land is used primarily for farming and ranching.

The tract contains about 6 percent (99 million tons) of the federal coal under current consideration in the Fort Union Region. The tract contains one economically recoverable seam of lignite coal. The seam averages 16 feet thick. Overburden ranges from less than 150 feet to 200 feet thick.

The generic mining plan calls for a surface mine using draglines, electric shovels, bottom-dump coal haulers, scrapers, and other support equipment. An on-site electrical generation plant would likely utilize the mined coal.

The nearest active mine is the Savage mine, 80 miles east of the tract. The tract lies on the western flank of the Williston Basin, where oil and gas exploration, discovery, and production are increasing. The tract contains no producing wells.



Wildlife oriented recreation such as hunting and observation is available.

SITE SPECIFIC ANALYSIS

Minerals

Because the tract is in the Williston Basin, it has a potential for oil and gas development. Coal mining and associated operations preclude or inhibit certain phases of oil and gas exploration. Coal mining could delay exploration activities for six to eight years or even for the entire life of the mine.

Wildlife

A significant portion of a regional pronghorn antelope population reproduce and winter on almost all of the tract. Development of the coal would cause habitat destruction, increased poaching, and increased human disturbance. These effects of mining would lead to destruction of the herd. This long-term impact would make reestablishment of pronghorn difficult.

Cultural

Information on cultural resource values in the area is scarce. The tract could contain significant archaeological or historical sites and/or artifacts. Potential loss of cultural resources can be considered significant, unless more information is collected to indicate otherwise. Inventory being contracted now would raise the level of confidence that loss would or would not occur. The loss of identified values, if any exist, would be long-term and irreversible.

Reclamation

Intermixing of calcareous horizons would increase the salinity of the soil and make reestablishment of vegetation more difficult. Special handling of overburden, which would increase coal mining costs, may be required. The salinity problem should be resolved in the mining plan, after more information is gathered.

Economic and Social

Construction and operation of a mine would result in significant impacts upon services in some communities. Glendive, Savage, Lambert, and Circle, Montana would experience significant increases in both population and employment.

Peak employment during the construction phase of the mine is expected to occur in 1986 at 205 employees, with full operations employment expected in 1989 at 290 employees. Community planners believe that Glendive, Circle, Savage, and Lambert would have an inadequate level of one or more community services as a direct result of the 1986 peak construction employment/population levels. Glendive, for example, would have an inadequate water supply as a result of population growth attributable to the construction of the mine. Fairview, Richey, Sidney, Brockway, and West Glendive would experience an inadequate level of some community services by 1986, even without mine development. A mine-related population influx in these communities would further worsen service inadequacies.

The population influx associated with full operation of the mine (1989 and beyond) would produce minor impacts to community services. However, Richey, Glendive, West Glendive, Sidney, Savage, Lambert, Fairview, Brockway, and Circle, all would find themselves with some inadequate public services by 1989, even without mine development. Development of the

mine would further worsen inadequate service situations in these communities.

The community of Circle would be significantly affected by development of the Circle West II tract. Its population would grow roughly 30% above the level projected without development. Given the slow decline in area population in the last several decades and the lack of experience with development, McCone County residents would clearly notice changes in the social atmosphere of their communities.

Agriculture

Development of the coal would have a significant short-term impact on individual agricultural operations in the tract. By the end of the mine life, 11,024 acres of the tract would have been disturbed, and 160 additional acres would be used for mine facilities.

An average of 3 acres of cropland, excluding summer fallow, would be removed from production each year. This cropland would be out of production ten to fifteen years, with a maximum of 17 to 26 acres out of production in any one peak mining year. The maximum annual loss would range from 483 to 738 bushels of wheat.

An average of 273 acres of rangeland would be taken out of production each year, resulting in an average loss of 76 AUMs (animal unit months). This rangeland would be out of production ten to fifteen years, with a maximum of 2,728 to 4,146 acres out of production in any one peak mining year. The maximum annual loss would range from 756 to 1,148 AUMs.

Losses caused by mining the tract would not significantly reduce regional agricultural production. Some individual operators would be severely affected, however.

An average of 273 acres of rangeland would be taken out of production each year.

FACILITY ANALYSIS

The coal mined from the tract would probably be used to fire an electric power generating plant located near the mine.

Agriculture

Approximately 600 acres for the facility site would be taken out of agricultural production. In a worst-case analysis, 8,520 bushels of wheat would be lost annually during the life of the power plant.

A short-term disruption of 12 acres per mile would result during construction of an undetermined length of water pipeline. Roadways would disturb 14.5 acres per mile. A railroad spur would eliminate agriculture on 18 acres per mile for the entire life of the power plant.

Potential negative impacts to vegetation and to livestock exist downwind from coal conversion facilities due to nitrogen oxides, sulfur dioxide, and particulate matter (West-Central North Dakota Regional Environmental Impact Study on Energy Development, 1978). These negative impacts would be analyzed in detail by the state permitting authorities during their review of facility permit applications.

Water

Water requirements for an electric power facility are approximately 13,000 acre-feet per year. The likely source of this water would be Fort Peck Reservoir. Present regulations require state approval of disposal sites for facility wastes of ash, sludge, and water.

Recreation

Recreation facilities in the region (community camping and picnic areas, Fort Peck Reservoir, and Charles M. Russell National Wildlife Refuge) are expected to satisfy the bulk of recreation demand from the projected increased population. The social attitude survey revealed a concern for existing recreation facilities. It was also stated that an increase in population might result in the upgrading of currently marginal recreation facilities.

Wildlife

Wildlife impacts associated with the electric power facility could occur in two areas: 1) impacts from destruction of habitat and 2) impacts from the increase in human population. The removal of vegetation for a 600-acre power plant and the expansion of urban areas, highways, and railroads would prevent or reduce the use of an area by wildlife, regardless of the type of vegetation removed. A large area south of the tract is essential antelope habitat. Golden eagle and prairie falcon nests are situated nearby, west of the tract, and deer have essential winter range east of the tract.

Powerlines, pipelines, and access roads could be con-

structed in key wildlife areas with partial or total destruction of habitat. Other anticipated impacts include eagle electrocutions on powerlines, migratory bird deaths from striking powerlines close to wetlands, road kills along transportation routes through wildlife areas, harassment of wildlife by off-road vehicle use, and increased poaching. These impacts, along with habitat destruction, would result in decreased wildlife populations in the area. Wildlife oriented recreation such as hunting and observation would have to be sought elsewhere.

Poaching and road kills have increased dramatically in areas of North Dakota, Montana, Wyoming, and Colorado where energy development has occurred. The problem is compounded where transportation corridors pass through wildlife areas and when employee shift changes coincide with wildlife feeding periods. This situation could occur in the tract area.

Taking water from shallow bays in Fort Peck Reservoir could have significant adverse impacts. These areas are prime nursery and spawning areas for sport, commercial, and forage fish. Fish eggs and young fish would be removed from the bays along with the water.

Aesthetics

The visual impact would be the penetration of the skyline by the facility, as seen from communities and major transportation corridors. The highly visible 600-foot stack could potentially be seen thirty or more miles away and would evoke a response either positive or negative. The dominance of the facility in the landscape could be perceived as a loss of amenity through impairment of the landscape for the 40 years of the expected life of the power plant.

Economic and Social

Construction and operation of the plant would result in impacts upon services in some communities. Savage, Lambert, Brockway, and Circle would experience increases in both population and employment as a result of development.

Peak employment during the construction phase is expected to occur in 1987 at 1,248 employees, with full operations employment expected in 1993 at 200 employees. The above communities would probably experience an inadequate level of one or more community services as a direct result of the 1987 peak construction employment/population levels. Savage, for example, is expected to have inadequate police, social services, and public health facilities as a result of population growth attributable to the construction of the facility. Sidney and Fairview would have an inadequate level of some community services by 1987, even without coal development. A plant-related population influx in these communities would worsen an inadequate service situation.

Full operation of the power plant (1993 and beyond) is also expected to result in impacts to community services. Savage would have inadequate fire protection due to the population influx associated with plant operation. Fairview, Sidney, Lambert, Circle, and Brockway are forecasted to have inadequate public services by 1991, even without tract development. Development of the plant would further worsen inadequate service situations in these communities.

A majority of interviewed respondents (in a random sample survey done by BLM) in McCone and Dawson counties support the construction and operation of a coal conversion facility or facilities in the area. Fifty-five persons were contacted, and roughly two-thirds of the respondents supported such a facility. While a significant number of persons qualified their support (e.g., their response was contingent upon maintenance of high air quality levels), the persons who opposed such facilities (about one-fourth of the sample) were typically adamant in their opposition.

If a power plant were placed in or near the tract, there would be a variable distribution of benefits and losses to area residents. Some persons would be unable to share in the benefits due to their lack of occupational skills, but others would financially benefit from such a facility. These would be persons who have usable skills, and persons who might not otherwise be employed but who desire employment. Because Dawson County is more diverse economically and socially, a somewhat higher proportion of persons in Dawson County than in McCone County would likely be in a position to take advantage of such a facility.

Construction of the plant would have an effect on those area characteristics most strongly endorsed by residents. The rapid population growth characteristic of construction would result in a more segmented, more stressful social environment than presently exists or would exist without the facility. The existing level of social homogeneity would be reduced. Persons who appreciate the relatively slow paced, informal, and friendly social environment would perceive a reduced quality of life. After completion of construction, routine social relations would be reestablished and the stressful social environment would likely be reduced, if not eliminated.

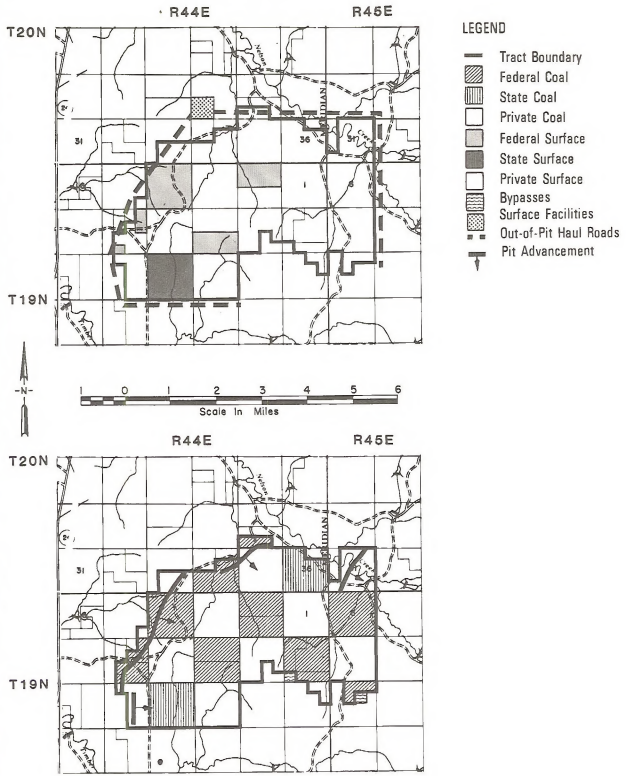
Dawson County and the cities of Glendive and West Glendive appear to be in a much more favorable position to deal with rapid population growth than McCone County and the communities of Circle and Brockway. Dawson County is more economically and socially diverse, has a larger population base, has not experienced the population losses of McCone County during the last several decades, and to some extent, has had experience with industrialization. For these reasons, the capacity of the communites in Dawson County and the county itself to absorb rapid growth and change is much greater than in McCone County.

Air Quality

Probable impacts to air quality were analyzed to determine compliance or noncompliance with Ambient Air Quality Standards and Prevention of Significant Deterioration (PSD) Standards for Class I and Class II areas.

With the use of a screening dispersion model for emissions from an electric power facility sited on the tract, it has been forecast that the facility would not violate Montana or North Dakota Ambient Air Quality Standards and would not violate the PSD Standards for Class I and Class II areas. The increased concentration levels for TSP, NOx, and SO_2 resulting from the facility were forecast to be below the detectable level at the border of the Class I area of the Theodore Roosevelt National Park in North Dakota.

SURFACE



CIRCLE WEST TRACT II

CIRCLE WEST II
SITE-SPECIFIC SUMMARY MATRIX

COAL ECONOMICS

TRACT RANKING SUBFACTORS	PRESENT SITUATION	COMMENTS	INFORMATION SOURCE
Coal Quality	Lignite, 7,400 to 7,520 Btus/lb. Sulfur 0.2 to 0.4%.		USGS
Coal Quantity	Recoverable - 245.7 million tons Reserves - average 28,000 ton/acre		USGS
Coal conservation and Maintenance of Production	90% recovery rate - New production		USGS
Energy Production	End-use possible mine mouth power plant.	Net energy analysis 1 Btu expended for 198 Btus produced.	BLM, USGS
Likelihood of Leasing and Development	Depends on market driven forces. One expression of leasing interest received.		BLM

IMPACTS TO THE NATURAL ENVIRONMENT

TRACT RANKING SUBFACTORS	PRESENT SITUATION	ANTICIPATED EFFECT OF LEASING/DEVELOPMENT	SIGNIFICANCE OF ANTICIPATED IMPACT
Air Quality	Excellent	Increase in total suspended particulates.	Insignificant
Minerals Other than Coal	Potential for oil and gas development.	Delay of exploration for oil and gas within the tract.	Significant
Water	Moderate chemical quality.	Decrease in the chemical quality of water passing through reclaimed soils.	Insignificant
Wildlife	Essential pronghorn habitat on most of tract.	Would destroy habitat and herd if mined. Increased poaching and disturbance.	Significant
Cultural Features	Inventory incomplete. Inventory under contract.	Unknown but potentially significant loss of knowledge	Significant
Amenity Values	High aesthetic quality, low scenic value	Moderate to low visual changes in short-term. Slight changes in long-term.	Insignificant
Special Management Areas/ Unique Resource Impacts	No wilderness, special management or ACEC's in area.	Precludes designation options in the future.	Insignificant
Other Land Use & Transportation	Activity is new to the area.	Displacement of agricultural use short-term. Relocation or bypass of transportation and utilities.	Insignificant

TRACT RANKING SUBFACTORS	PRESENT SITUATION	ANTICIPATED EFFECT OF LEASING/DEVELOPMENT	SIGNIFICANCE OF ANTICIPATED IMPACT
Reclamation Potential	Approximately 47% of the tract has poor reconstruction potential	Salinity increases due to intermixing of soil horizons.	Significant
Unsuitability Criteria	Buffer zones and cultural deferred to mine plan. Alluvial valley floors to OSM; federal and state listed endangered species, eagle nests, roost and concentration areas, falcon nesting sites, migratory birds, and state resident fish and wildlife need further study.	Not applicable	Not applicable
	SOCIAL AND ECONOMIC		
Economic Changes	Population and employment levels forecasted relatively stable through 2000 A.D. Regional income to increase moderately.	Glendive, Lambert, Savage, and Circle would experience population increases. Regional income will increase slightly.	Significant
Community Service Assessment	Most services adequate or barely adequate. Resident perception of problem areas include medical care, recreation/entertainment, and roads/traffic.	One or more services would become inadequate in Glendive, Lambert, Savage, and Circle.	Significant
Public Attitudes	Generally support (conditionally) coal development in Dawson, Richland, and McCone Counties.	Not Applicable	Not Applicable
Lifestyle and Social Structure	Most residents favor the informal, small town atmosphere.	Some slight deterioration of quality of life in Glendive, Savage, and Lambert with significant deterioration in Circle.	Significant
Agricultural Operations	There are 113 acres of existing cropped land.	Average annual loss of 3 acres (85 bu. of wheat) excluding 45 acres of summer-fallow, Maximum loss/peak mining year=17 to 26 acres (483 to 738 bu. of wheat).	Significant
Consistency with other Plans and Policies	BLM - Management Framework Plan of 1979.	Not Applicable	Not Applicable

CIRCLE WEST III

The Circle West III tract is approximately 20 miles west of Circle, in McCone County, Montana. The land is primarily used for farming and ranching.

The tract contains about 9 percent (175 million tons) of the federal coal under current consideration in the Fort Union Region. The tract contains one economically recoverable seam of lignite coal. The seam averages 16.2 feet thick. Overburden ranges from less than 150 feet to 200 feet thick.

The generic mining plan calls for a surface mine using draglines, electric shovels, bottom-dump coal haulers, scrapers, and other support equipment. An indirect liquefaction plant would likely utilize the mined coal.

The nearest active mine is the Savage mine, 80 miles east of the tract. The tract lies on the western flank of the Williston Basin, where oil and gas exploration, discovery, and production are increasing. The tract contains no producing oil or gas wells.

SITE SPECIFIC ANALYSIS

Minerals

Because the tract is located in the Williston Basin, it has a potential for oil and gas development. Coal mining and associated operations preclude or inhibit certain phases of oil and gas exploration. Coal mining could delay exploration activities for six to eight years or even for the entire life of the mine.

Wildlife

A significant portion of the resident pronghorn population for a large area reproduce and winter on the south part of the tract. Habitat destruction, increased poaching, and disturbance from mining activity would lead to destruction of the herd. This long-term impact would make reestablishment of pronghorn difficult.

Cultural

Information on cultural resource values in the area is scarce. The tract could contain significant archaeological or historical sites and/or artifacts. Loss of these cultural resources (due to mining) can be considered significant, unless more information is collected to indicate otherwise. Inventory being contracted now would raise the level of confidence that loss would or would not occur. The loss of identified values, if any exist, would be long-term and irreversible.

Reclamation

Intermixing of calcareous horizons would increase the salinity of the soil and make reestablishment of vegetation more difficult. Special handling of overburden, which would increase coal extraction costs, may be required. More information is required, and the salinity problem should be resolved in the mining plan.

Economic and Social

Construction and operation of a mine in the tract would result in impacts upon services in some communities. Glendive, Circle, Savage, and Lambert, Montana would experience increases in both population and employment.

Peak employment during the construction phase of the Circle West III mine is expected to occur in 1986 at 260 employees, with full operations employment expected in 1991 at 425 employees. The communities of Glendive, Circle, Savage, and Lambert would probably experience an inadequate level of one or more community services as a direct result of the 1986 peak construction employment/population levels. Glendive, for example, would have an inadequate water supply as a result of population growth attributable to the construction of the mine. Bloomfield, Richey, Lindsay, West Glendive, Sidney, and Fairview would have some inadequate community services by 1986, even without mine development. A mine-related population influx in these communities would cause these services to fall even further behind in meeting the needs of the residents.

Full operation of the Circle West III mine (1991 and beyond) would produce minor impacts to community services. Police service in Glendive would probably be inadequate because of operation-phase population influx. However, Richey, West Glendive, Sidney, Savage, Lambert, Fairview, Circle, Lindsay, and Bloomfield all would find themselves with some inadequate public services by 1991, even without mine development. Development and operation of the mine would cause these services to fall even further behind in meeting the needs of the communities.

In McCone County, roughly 150 people above baseline are expected to reside in Circle during the construction phase of tract development. This is a significant number of new residents, but the increase would last only for a couple of years. In the mid-1980s and thereafter, the population increase would fall to insignificant levels.

The majority of the effects attributable to proposed mining in the tract would occur in Glendive and West Glendive. The combined population increases of this operation would total over 1,000 persons above that projected without mining. Given the existing diversity and stable population base of Glendive and West Glendive, it appears that the social effects, while important

would not be as disruptive as in other, more exclusively agricultural areas. Relationships among people in relatively large communities, such as the Glendive area, are segmented and formal as compared to more rural areas, such as McCone County.

Agriculture

Development would have a significant short-term impact on individual agricultural operations in the tract. By the end of the mine life, 20,882 acres of the tract would have been disturbed, and 160 additional acres would be used for mine facilities.

An average of 12 acres of cropland, excluding summer fallow, would be removed from production each year. This cropland would be out of production ten to fifteen years, with a maximum of 94 to 147 acres out of production in any one peak mining year. The maximum loss would range from 2,670 to 4,175 bushels of wheat annually.

Peak mining year disturbance of 183 acres of hayland would result in maximum annual loss of 183 tons of hay production.

An average of 563 acres of rangeland would be taken out of production each year, resulting in an average loss of 156 AUMs (animal unit months). This rangeland would be out of production ten to fifteen years, with a maximum of 5,459 to 8,492 acres out of production in any one peak mining year. The maximum annual loss would range from 1,512 to 2,352 AUMs.

Regionally, these losses would not significantly reduce agricultural production, but some individual operators would be severely impacted.

FACILITY ANALYSIS

The coal mined from the tract would likely be used in an indirect liquefaction plant located near the mine.

Agriculture

Approximately 960 acres for the facility site would be taken out of agricultural production. In a worst-case analysis, 13,632 bushels of wheat would be lost annually during the life of the indirect liquefaction plant (based on current land use).

A short-term disruption of 12 acres per mile would result during construction of an undetermined length of water pipeline. Roadways would disturb 14.5 acres per mile. A railroad spur would eliminate agriculture on 18 acres per mile for the entire life of the facility.

Potential negative impacts to vegetation and to livestock exist downwind from coal conversion facilities due to nitrogen oxides, sulfur dioxide, and particulate matter (West-Central North Dakota Regional Environmental Study on Energy Development, 1978). These negative impacts would be analyzed in detail by the state permitting authorities during their review of facility permit applications.

Water

Water requirements for an indirect liquefaction plant are approximately 11,500 acre-feet per year. Fort Peck Reservoir is the likely source of this water for industrial use. Present regulations require state approval of disposal sites for facility wastes of ash, sludge, and water.

Recreation

Recreation facilities in the region (community camping and picnic areas, Fort Peck Reservoir, and Charles M. Russell National Wildlife Refuge) probably would receive the bulk of recreation demand from the projected increased population. The social attitude survey revealed a concern for existing recreation facilities. It was also stated that an increase in population might result in the upgrading of currently marginal recreation facilities.

Wildlife

Wildlife impacts associated with the indirect liquefaction plant occur in two areas: 1) impacts from destruction of habitat and 2) impacts from the increase in human population. The removal of vegetation for a 960-acre facility and the expansion of urban areas, highways, and railroads would prevent or reduce the use of an area by wildlife, regardless of the type of vegetation removed. A large area south of the tract is essential antelope habitat. Golden eagles and prairie falcons nest nearby, west of the tract, and deer have essential winter range east of the tract.

Powerlines, pipelines, and access roads could be constructed in key wildlife areas with partial or total destruction of habitat. Other anticipated impacts include eagle electrocution on powerlines, migratory bird deaths from striking powerlines close to wetlands, road kills along transportation routes through wildlife areas, harassment of wildlife by off-road vehicle use, and increased poaching. These impacts, along with habitat destruction, would result in decreased wildlife populations in the area. Wildlife oriented recreation such as hunting and observation would have to be sought elsewhere.

Poaching and road kills have increased dramatically in areas of North Dakota, Montana, Wyoming, and Colorado where energy development has occurred. The problem is compounded where transportation corridors pass through wildlife areas and when employee shift changes coincide with wildlife feeding periods. This situation could occur in the tract area.

Taking water from shallow bays in Fort Peck Reservoir could have significant adverse impacts. These areas are prime nursery and spawning areas for sport, commercial, and forage fish. Eggs and young fish would be removed from the bays along with the water.

Aesthetics

The visual impact would be the penetration of the skyline by the facility, as seen from communities and major transportation corridors. The 500-foot stack could potentially be seen thirty or more miles away and would elicit a response either positive or negative. The dominance of the facility in the landscape could be perceived as a loss of amenity through impairment of the landscape for the 40 years of the expected life of the plant.

Economic and Social

Construction and operation of the indirect liquefaction plant would result in impacts upon services in some communities. Richey, Lindsay, West Glendive, and Circle would experience increases in both population and employment as a result of development.

Peak employment during the construction phase is expected to occur in 1987 at 2,617 employees, with full operations employment expected in 1993 at 900 employees. By 1987, the above communities would probably experience an inadequate level of one or more community services as a direct result of construction employment/population levels. West Glendive, for example, would have inadequate police protection as a result of population growth. Brockway would have an inadequate level of all community services by 1987, even without coal development. A facility-related population influx in this community would worsen an inadequate service situation.

Full operation of the facility (1993 and beyond) is also expected to result in impacts to community services. Glendive would experience inadequate police protection as a direct result of the population influx resulting from facility operation. Richey, Lindsay, West Glendive, Circle, and Brockway are forecasted to have inadequate public services by 1991, even without tract development. Development of the facility would further worsen inadequate service situations in these communities.

Most respondents to a BLM random sample survey in both McCone County and Dawson County endorsed the construction of a coal conversion facility or facilities in the area. Roughly two-thirds of the fifty-five persons contacted in the two-county area supported such a facility; however, persons who expressed opposition to such facilities tended to be more firm than the proponents. While supporting the construction of a facility, many proponents did express concern over possible air quality and social effects.

The consequences to individuals in McCone and Dawson counties would be unevenly distributed if a facility were to be constructed near the tract. Some would be unable to share in the benefits of such a facility, but would have to bear substantial frustrations and face a more difficult social environment. Other persons, due to their job skills, potential skills, or interest in employment, would be in a position to take advantage of coal development. This would be particularly evident during the construction phase but would persist into the future during the operations phase as well.

Since the present way of life in the communities of McCone and Dawson counties is appealing to most residents, these persons' satisfaction with their community likely would decline if a coal conversion facility were constructed. Rapid population growth would cause the communities to be less homogeneous, more stressful, more unpredictable, and more impersonal than they are today. Therefore, a significant impact of such a facility would be a reduction in residents' satisfaction with their community of residence.

Community capacities to absorb the population growth attached to the plant are variable. Glendive-West Glendive and Richey in Dawson County would face very rapid growth during the construction phase of the project. However, these communities have more experience with industrialization, are larger, and are more diversified than communities in McCone County. These factors would be assets in Dawson County's ability to deal with rapid growth during both the construction and operation phases.

Construction of the facility would cause severe impacts in McCone County, particularly in Circle and Brockway. During the construction phase, these agricultural communities would experience a level of growth that would be very difficult to bear. At least during the construction phase, the appearance of Circle would be one of significant change.

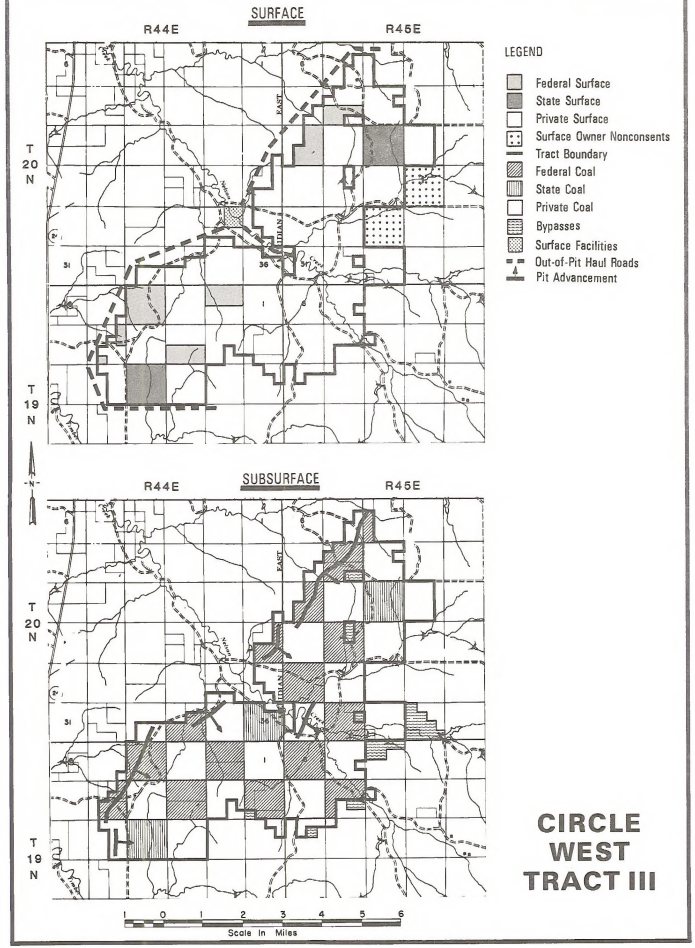
During the operations phase, some stability would emerge in both Dawson and McCone counties, but the labor force requirements of such a plant would be large enough so that the communities would be fundamentally altered. Changes in Circle and Brockway would be persistent and extensive. Agricultural operators and the persons attached to agriculture would lose some of their dominance, as energy would move into prominence as part of the local economic base.

There would be significant effects in Glendive-West Glendive during the construction phase, with long-term stability expected. In McCone County, the communities of Circle and Brockway would be significantly affected, most noticeably during the construction phase, but also during the operations phase.

Air Quality

Probable impacts to air quality were analyzed to predict compliance or noncompliance with Ambient Air Quality Standards and Prevention of Significant Deterioration (PSD) Standards for Class I and Class II areas.

With the use of a screening dispersion model for emissions from an indirect liquefaction facility sited on the tract, it has been forecast that the facility would not violate Montana or North Dakota ambient air quality standards and would not violate PSD Standards for Class I and Class II areas. The increased concentration levels for TSP, NOx, and SO_2 resulting from the facility were forecast to be below the detectable level at the border of the Class I area of the Theodore Roosevelt National Park in North Dakota.


SURFACE
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LEGEND
Federal Surface
State Surface
Private Surface
Surface Owner Nonconsents
Tract Boundary
Federal Coal
State Coal
Private Coal
Bypasses
Surface Facilities
Out-of-Pit Haul Roads
Pit Advancement
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CIRCLE WEST TRACT III

CIRCLE WEST III
SITE-SPECIFIC SUMMARY MATRIX

COAL ECONOMICS

TRACT RANKING SUBFACTORS	PRESENT SITUATION	COMMENTS	INFORMATION SOURCE
Coal Quality	Lignite, 7,460 Btus/lb average. Sulfur 0.2 to 0.4%.		USGS
Coal Quantity	Recoverable - 461.7 million tons Reserves - average 28,400 ton/acre		USGS
Coal conservation and Maintenance of Production	90% recovery rate - New production		USGS
Energy Production	End-use possible mine mouth liquefaction plant.	Net energy analysis 1 Btu expended for 198 Btus produced.	BLM, USGS
Likelihood of Leasing and Development	Depends on market driven forces. Three expressions of leasing interest received.		BLM

IMPACTS TO THE NATURAL ENVIRONMENT

TRACT RANKING SUBFACTORS	PRESENT SITUATION	ANTICIPATED EFFECT OF LEASING/DEVELOPMENT	SIGNIFICANCE OF ANTICIPATED IMPACT
Air Quality	Excellent	Increase in total suspended particulates.	Insignificant
Minerals Other than Coal	Potential for oil and gas development.	Delay of exploration for oil and gas within the tract.	Significant
Water	Moderate chemical quality.	Decrease in the chemical quality of water passing through reclaimed soils.	Insignificant
Wildlife	Essential pronghorn habitat on south half of tract.	Would destroy habitat and herd if mined. Increased poaching and disturbance.	Significant
Cultural Features	Inventory incomplete. Inventory under contract.	Unknown but potentially significant loss of knowledge	Significant
Amenity Values	High aesthetic quality, low scenic value	Moderate to low visual changes in short-term. Slight changes in long-term.	Insignificant
Special Management Areas/ Unique Resource Impacts	No wilderness, special management or ACEC's in area.	Precludes designation options in the future.	Insignificant
Other Land Use & Transportation	Activity is new to the area.	Displacement of agricultural use short-term. Relocation or bypass of transportation and utilities.	Insignificant

TRACT RANKING SUBFACTORS	PRESENT SITUATION	ANTICIPATED EFFECT OF LEASING/DEVELOPMENT	SIGNIFICANCE OF ANTICIPATED IMPACT
Reclamation Potential	Approximately 48% of the tract has poor reconstruction potential	Salinity increases due to intermixing of soil horizons.	Significant
Unsuitability Criteria	Buffer zones and cultural deferred to mine plan. Alluvial valley floors to OSM; federal and state listed endangered species, eagle nests, roost and concentration areas, falcon nesting sites, migratory birds, and state resident fish and wildlife need further study.	Not applicable	Not applicable
	SOCIAL AND ECONOMIC		
Economic Changes	Population and employment levels forecasted relatively stable through 2000 A.D. Regional income to increase moderately.	Glendive, Lambert, Savage, and Circle would experience population increases. Regional income will increase slightly.	Significant
Community Service Assessment	Most services adequate or barely adequate. Resident perception of problem areas include medical care, schools, recreation/entertainment, roads/traffic, and services for elderly.	One or more services would become inadequate in Glendive, Lambert, Savage, and Circle.	Significant Not Applicable
Public Attitudes	Generally support (conditionally) coal development in Dawson, Richland, and McCone Counties in Montana and Golden Valley County in North Dakota.	Not Applicable	Significant
Lifestyle and Social Structure	Most residents favor the informal, small town atmosphere.	Some slight deterioration of quality of life in Glendive, Savage, and Lambert with significant deterioration in Circle.	Significant
Agricultural Operations	There are 664 acres of existing cropped land.	Average annual loss of 12 acres (341 bu. of wheat) excluding 132 acres of summer-fallow, Maximum loss/peak mining year=94 to 147 acres (2,670 to 4,175 bu. of wheat).	Not Applicable
Consistency with other Plans and Policies	BLM - Management Framework Plan of 1979.	Not Applicable	

REDWATER I

The Redwater I tract is directly northeast of Circle, in eastern McCone County, Montana. The land is primarily used for farming and ranching.

The tract contains 13 percent (202 million tons) of the federal coal currently under consideration in the Fort Union Region. The tract contains one economically recoverable seam of lignite coal. The seam averages 14.8 feet in thickness. Overburden ranges from less than 150 feet to 200 feet in thickness.

The generic mining plan calls for a surface mine using draglines, electric shovels, bottom-dump coal haulers, scrapers, and other support equipment. An on-site gasification plant would utilize the mined coal.

The nearest active mine is the Savage mine, 56 miles east of the tract. The tract lies on the western flank of the Williston Basin, where oil and gas exploration, discovery, and production are increasing. The tract contains no producing oil or gas wells.

Development would have a significant short-term impact on individual agricultural operations in the tract.

SITE SPECIFIC ANALYSIS

Minerals

Because the tract is located in the Williston Basin, it has a potential for oil and gas development. Coal mining and associated operations preclude or inhibit certain phases of oil and gas exploration and development. Coal mining could delay exploration activities for six to eight years or even for the entire life of the mine.

Wildlife

The Redwater River valley bottom is being considered as an alluvial valley floor and may be declared unsuitable for surface mining. If declared unsuitable, the impacts to wildlife and fisheries would probably be limited to those caused by increased human populations. If declared suitable for mining, the Redwater River could be diverted. This would result in a loss of a nearby fishing area (producing walleye and northern pike) for the residents of Circle and other nearby towns. The spawning areas downstream would probably be destroyed if the stream were dewatered during mining. If the drainage could be adequately reclaimed these would be short-term impacts. A significant opportunity exists to create a high quality hunting and fishing area after mining.

Cultural

Information on cultural resource values in the area is scarce. The tract could contain significant archaeological or historical sites and/or artifacts. Loss of these cultural resources (due to mining) can be considered significant, unless more information is collected to indicate otherwise. Inventory being contracted now would raise the level of confidence that loss would or would not occur. The loss of identified values, if any exist, would be long-term and irreversible.

Reclamation

Intermixing of calcareous horizons would increase the salinity of the soil and make reestablishment of vegetation more difficult. Special handling of overburden, which would increase coal extraction costs, may be required. The salinity problem should be resolved in the mining plan, after more information has been gathered.

Economic and Social

Construction and operation of a mine in the tract would result in impacts upon services in some communities. Glendive, Circle, Savage, and Lambert, Montana would experience increases in both population and employment.

Peak employment during the construction phase of the Redwater I mine is expected to occur in 1986 at 265 employees, with full operations employment expected in 1991 at 450 employees. The communities of Glendive, Circle, Savage, and Lambert would probably experience an inadequate level of one or more community services as a direct result of the 1986 peak construction employment/population levels. Glendive, for example, would have an inadequate water supply as a result of population growth attributable to the construction of the Redwater I mine. Bloomfield, Richey, Lindsay, West Glendive, Brockway, Sidney, and Fairview would have some inadequate community services by 1986, even without mine development. A mine-related population influx in these communities would cause these services

to fall even further behind in meeting the needs of the residents.

Full operation of the Redwater I mine (1991 and beyond) is not expected to result directly in impacts to community services. None of the communities in the area is expected to have inadequate public services attributable to the operation-phase population influx. However, Richey, Glendive, West Glendive, Sidney, Savage, Lambert, Fairview, Brockway, Circle, Lindsay, and Bloomfield all would find themselves with some inadequate public services by 1991, even without mine development. Development of the Redwater I mine would cause these services to fall even farther behind in meeting the needs of the communities.

Agriculture

Development would have a significant short-term impact on individual agricultural operations in the tract. By the end of the mine life, 22,786 acres of the tract would have been disturbed, and 160 additional acres would be used for mine facilities.

An average of 145 acres of cropland, excluding summer fallow, would be removed from production each year. This cropland would be out of production ten to fifteen years, with a maximum of 1,439 to 2,158 acres out of production in any one peak mining year. The maximum loss would range from 40,868 to 61,287 bushels of wheat annually.

Peak mining year disturbance of 628 acres of hayland would result in an annual loss of 628 tons of hay production.

An average of 449 acres of rangeland would be taken out of production each year, resulting in an average loss of 124 AUMs (animal unit months). This rangeland would be out of production ten to fifteen years, with a maximum of 4,433 to 6,650 acres out of production in any one peak mining year. The maximum annual loss would range from 1,228 to 1,842 AUMs.

Regionally, these losses would not significantly reduce agricultural production, but some individual operators would be severely impacted.

FACILITY ANALYSIS

The coal mined from the tract would probably be used in a gasification plant located near the mine.

Agriculture

Approximately 960 acres for the facility site would be taken out of agricultural production. In a worst-case analysis, 13,632 bushels of wheat would be lost annually during the life of the gasification plant (based on current land use).

Ranching and farming are the primary uses of the land.

A short-term disruption of 12 acres per mile would result during construction of an undetermined length of water pipeline. Roadways would disturb 14.5 acres per mile. A railroad spur would eliminate agriculture on 18 acres per mile for the entire life of the facility.

Potential negative impacts to vegetation and to livestock exist downwind from coal conversion facilities due to nitrogen oxides, sulfur dioxide, and particulate matter (West-Central North Dakota Regional Environmental Impact Study on Energy Development, 1978). These negative impacts would be analyzed in detail by the state permitting authorities during their review of facility permit applications.

Water

Water requirements for a gasification plant are approximately 12,000 acre-feet per year. The probable source for this water would be Fort Peck Reservoir. Present regulations require state approval of disposal sites for facility wastes of ash, sludge, and water.

Recreation

Recreation facilities in the region (community camping and picnic areas, Fort Peck Reservoir, and Charles M. Russell National Wildlife Refuge) probably would receive the bulk of recreation demand from the projected increased population. The social attitude survey revealed a concern for existing recreation facilities. It was also stated that an increase in population might result in the upgrading of already marginal recreation facilities.

Wildlife

Wildlife impacts associated with the gasification plant occur in two areas: 1) impacts from destruction of habitat and 2) impacts from the increase in human population. The removal of vegetation for a 960-acre facility

and the expansion of urban areas, highways, and railroads would prevent or reduce the use of an area by wildlife regardless of the type of vegetation removed. Wildlife inventories will not be completed until December 1981.

Powerlines, pipelines, and access roads could be constructed in key wildlife areas with partial or total destruction of habitat. Other anticipated impacts include eagle electrocution on powerlines, migratory bird deaths from striking powerlines close to wetlands, road kills along transportation routes through wildlife areas, harassment of wildlife by off-road vehicle use, and increased poaching. These impacts, along with habitat destruction, would result in decreased wildlife populations in the area. Wildlife oriented recreation such as hunting and observation would have to be sought elsewhere.

Poaching and road kills have increased dramatically in areas of North Dakota, Montana, Wyoming, and Colorado where energy development has occurred. The problem is compounded where transportation corridors pass through wildlife areas and when employee shift changes coincide with wildlife feeding periods. This situation could occur in the tract area.

Taking water from shallow bays in Fort Peck Reservoir could have significant adverse impacts. These areas are prime nursery and spawning areas for sport, commercial, and forage fish. Eggs and young fish would be removed from the bays along with the water.

Aesthetics

The visual impact would be the penetration of the skyline by the facility, as seen from communities and major transportation corridors (State Highways 13, 200S, and 200). The 500-foot stack could potentially be seen thirty or more miles away and would elicit a response either positive or negative. The dominance of the facility in the landscape could be perceived as a loss of amenity through impairment of the landscape for the 40 years of the expected life of the plant.

Economic and Social

Construction and operation of the gasification plant would result in impacts upon services in some communities. Glendive, Bloomfield, Richey, Lindsay, West Glendive, and Circle would experience increases in both population and employment as a result of development.

Peak employment during the construction phase is expected to occur in 1987 at 2,617 employees, with full operations employment expected in 1993 at 900 employees. By 1987, the above communities would probably experience an inadequate level of one or more community services as a direct result of construction employment/population levels. Richey, for example, would have inadequate police protection as a result of population growth. Brockway would have an inadequate level of all community services by 1987, even without coal development. A facility-related population influx in this community would worsen an inadequate service situation.

Full operation of the facility (1993 and beyond) is also expected to result in impacts to community services. Savage would experience inadequate police protection as a direct result of the population influx resulting from facility operation. Bloomfield, Richey, Lindsay, West Glendive, Circle, and Brockway are forecasted to have inadequate public services by 1991, even without tract development. Development of the facility would further worsen inadequate service situations in these communities.

Social effects of the proposed Redwater I facility would be distributed through Dawson, Richland, and McCone counties. Eighty-seven residents of this three-county area were contacted by BLM in a random survey and asked about their feelings toward a coal conversion facility. Almost three-fourths of the persons contacted expressed support for such a plant. The support was qualified, however with concerns expressed toward air quality, surface water protection, and local social and administrative problems.

Throughout the three-county area, some residents would be in a position to take advantage of the benefits of a gasification plant, while others would be unable to share in the benefits. Those who would benefit economically from the project include local merchants, persons who have or acquire industrial job skills, and persons outside the labor force who are looking for work. All residents would be faced with a different environment, which would be less predictable, more stressful, more diverse, more impersonal, and, in general, less satisfying than the one that presently exists or the one that would exist without development.

A Redwater I plant would result in population growth levels in Dawson, McCone, and Richland counties that would stretch or exceed the area's capacity to deal with them. In Dawson County, this would be most pronounced during the construction phase in Glendive, West Glendive, and Richey. These changes in Dawson County communities would persist in the future but not as significantly.

The operation phase would lead to greater long-term stability. In Richland County, Sidney would experience significant growth during construction, with virtually no change from baseline during the operation phase. Sidney, Glendive-West Glendive, and to lesser extent, Richey would be better prepared to deal with such growth, both socially and administratively, than would McCone County.

McCone County is an agricultural area with no industrialization experience. Its existing population is not par-

ticularly diverse occupationally, and the population level is quite low. A Redwater I facility could simply overwhelm the communities of Circle and Brockway. This would be particularly acute during the construction phase, as large numbers of newcomers would enter these communities. The absorptive capacity of Circle and Brockway, and the county as a whole, would be clearly exceeded. Managing the problems attached to such rapid growth would require extraordinary skill on the part of local administrators.

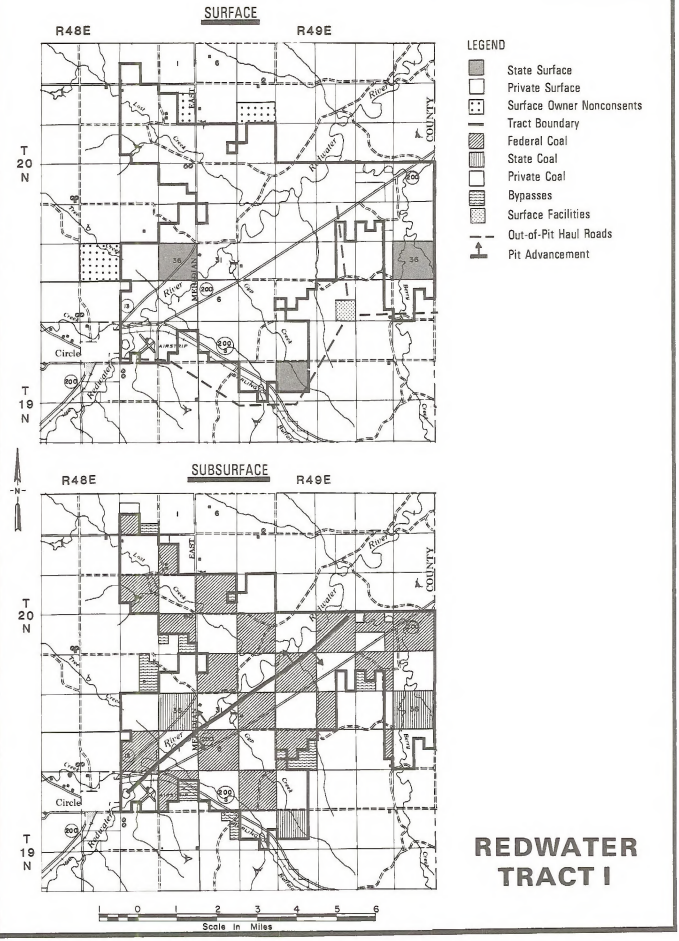
Dawson and Richland counties (particularly Glendive-West Glendive, Richey, and Sidney) would experience short-term social effects of a substantial scale. In McCone County, in the communities of Brockway and Circle, the changes would be of longer term and more fundamental significance. After the construction phase, the effects of a gasification facility would be less noticeable, but the social structures (political, interactive, leisure, organizational, and religious) of these communities would be significantly and persistently changed. The change in the local economic base would result in the reduction in the prestige and prominence of the agricultural sector and persons attached to it. This would apply to Dawson and Richland counties, but, because of its present environment, would be most pronounced in McCone County.

Energy development would bring with it some economic stability that presently does not exist in these agricultural areas. This could be a major benefit to persons and communities faced with an unpredictable climate and agricultural market.

Air Quality

Probable impacts to air quality were analyzed to predict compliance or noncompliance with Ambient Air Quality Standards and Prevention of Significant Deterioration (PSD) Standards for Class I and Class II areas.

With the use of a screening dispersion model for emissions from a gasification facility sited on the Redwater I tract, it has been forecast that the facility would not violate Montana or North Dakota Ambient Air Quality Standards and would not violate PSD Standards for Class I and Class II areas. The increased concentration levels for TSP, NOx, and SO_2 resulting from the facility were forecast to be below the detectable level at the border of the Class I area of the Theodore Roosevelt National Park in North Dakota.



REDWATER TRACT I

REDWATER I
SITE-SPECIFIC SUMMARY MATRIX

COAL ECONOMICS

TRACT RANKING SUBFACTORS	PRESENT SITUATION	COMMENTS	INFORMATION SOURCE
Coal Quality	Lignite, 6,750 Btus/lb. Sulfur 0.2 %.		USGS
Coal Quantity	Recoverable - 463.5 million tons Reserves - average 25,900 ton/acre		USGS
Coal conservation and Maintenance of Production	90% recovery rate - New production		USGS
Energy Production	End-use possible mine mouth gasification plant.	Net energy analysis 1 Btu expended for 179 Btus produced.	BLM, USGS
Likelihood of Leasing and Development	Depends on market driven forces. Two expressions of leasing interest received.		BLM

IMPACTS TO THE NATURAL ENVIRONMENT

TRACT RANKING SUBFACTORS	PRESENT SITUATION	ANTICIPATED EFFECT OF LEASING/DEVELOPMENT	SIGNIFICANCE OF ANTICIPATED IMPACT
Air Quality	Excellent	Increase in total suspended particulates.	Insignificant
Minerals Other than Coal	Potential for oil and gas development.	Delay of exploration for oil and gas within the tract.	Significant
Water	Moderate chemical quality.	Decrease in the chemical quality of water passing through reclaimed soils.	Insignificant
Wildlife	Most wildlife values along Redwater River which may be on an alluvial valley floor.	Increased poaching and disturbance.	Significant
Cultural Features	Inventory incomplete. Inventory under contract.	Unknown but potentially significant loss of knowledge	Significant
Amenity Values	High aesthetic quality, low scenic value	Highly visible from Circle and three state highways.	Insignificant
Special Management Areas/ Unique Resource Impacts	No wilderness, special management or ACEC's in area.	Precludes designation options in the future.	Insignificant
Other Land Use & Transportation	Activity is new to the area.	Displacement of agricultural use. Relocation or bypass of transportation and utilities.	Insignificant

TRACT RANKING SUBFACTORS	PRESENT SITUATION	ANTICIPATED EFFECT OF LEASING/DEVELOPMENT	SIGNIFICANCE OF ANTICIPATED IMPACT
Reclamation Potential	Approximately 54% of the tract has poor reconstruction potential	Salinity increases due to intermixing of soil horizons.	Significant
Unsuitability Criteria	Buffer zones and cultural deferred to mine plan. Alluvial valley floors to OSM; federal and state listed endangered species, eagle nests, roost and concentration areas, falcon nesting sites, migratory birds, and state resident fish and wildlife need further study.	Not applicable	Not applicable
	SOCIAL AND ECONOMIC		
Economic Changes	Population and employment levels forecasted relatively stable through 2000 A.D. Regional income to increase moderately.	Glendive, Lambert, Savage, and Circle would experience population increases. Regional income will increase slightly.	Significant
Community Service Assessment	Most services adequate or barely adequate. Resident perception of problem areas include medical care, recreation/entertainment, roads/traffic.	One or more services would become inadequate in Glendive, Lambert, Savage, and Circle.	Significant
Public Attitudes	Generally support (conditionally) coal development in Dawson, Richland, and McCone Counties.	Not Applicable	Not Applicable
Lifestyle and Social Structure	Most residents favor the informal, small town atmosphere.	Some slight deterioration of quality of life.	Significant
Agricultural Operations	There are 7,841 acres of existing cropped land. Irrigated lands are adjacent to bottomlands.	Average annual loss of 145 acres (4,118 bu. of wheat) excluding 2,581 acres of summer-fallow, Maximum loss/peak mining year=1,439 to 2,158 acres (40,869 to 61,287 bu. of wheat).	Significant
Consistency with other Plans and Policies	BLM - Management Framework Plan of 1979.	Not Applicable	Not Applicable

REDWATER II

The Redwater II tract is approximately nine miles directly northeast of Circle, in eastern McCone and western Dawson counties, Montana. The land is used primarily for farming and ranching.

The tract contains about 8 percent (124 million tons) of the federal coal under current consideration in the Fort Union Region. It contains one economically recoverable seam of lignite coal which averages 10.5 feet thick. Overburden ranges from less than 150 feet to 200 feet in thickness.

The generic mining plan calls for a surface mine using draglines, electric shovels, bottom-dump coal haulers, scrapers, and other support equipment. An on-site electrical generation plant would use the mined coal.

The tract contains two inactive small mines which shut down in 1968. The nearest active mine is the Savage mine, which is 56 miles east of the tract. The tract lies on the western flank of the Williston Basin, where oil and gas exploration, discovery, and production are increasing. The tract contains no producing wells.

Terrain typical of the tract.

SITE SPECIFIC ANALYSIS

Minerals

Because the tract is in the Williston Basin, it has a potential for oil and gas development. Coal mining and associated operations preclude or inhibit certain phases of oil and gas exploration. Coal mining could delay exploration activities for six to eight years, or even for the entire productive life of the mine.

Wildlife

The floodplain of the Redwater River is being considered as an alluvial valley floor and may be declared unsuitable for surface mining. If declared unsuitable, the impacts to wildlife and fisheries would be limited to those occurring from increased human populations. If declared suitable for mining, the Redwater River would be diverted. This would result in the loss of a nearby fishing area (producing walleye and northern pike), which is used by residents of Circle and other nearby towns. The spawning areas downstream would probably be destroyed if the stream is diverted during mining. If the drainage can be adequately reclaimed, these would be short-term impacts. A significant opportunity exists to create a high quality hunting and fishing area after mining.

Cultural

Information on cultural resource values in the area is scarce. The tract could contain significant archaeological or historical sites and/or artifacts. Impacts to these potential resources can be considered significant, unless more information is collected to indicate otherwise. Inventory being contracted now would raise the level of confidence that loss would or would not occur. The loss of identified values, if any exist, would be long-term and irreversible.

Reclamation

Intermixing of calcareous horizons would increase the salinity of the soil and make reestablishment of vegetation more difficult. Special handling of overburden, which would increase coal mining costs, may be required. The salinity problem should be resolved in the mining plan, after more information has been gathered.

Economic and Social

Construction and operation of a mine in the Redwater II tract would result in significant impacts to services in some communities. Lambert, Savage, Circle, and Glendive, Montana would experience a significant increase in both population and employment.

Peak employment during the construction phase of the Redwater II tract is expected to occur 1986 at 210 employees, with full operations employment expected in 1991 at 300 employees. By 1986, one or more community services in Lambert, Savage, Circle, and Glendive probably would be inadequate as a direct result of the peak construction employment/population levels. For example, elementary school facilities at Circle are likely to be inadequate as a result of population growth attributable to the construction of the Redwater II mine. Fairview, Sidney, West Glendive, and Richey would have inadequate levels of some community services by 1986 even without tract development. A mine-related population influx would worsen service inadequacies in these communities.

Full operation of the Redwater II mine (1991 and beyond) is not expected to result directly in impacts to community services. None of the communities is expected to experience inadequate public services associated with mine operation. However, Savage, Circle, Lambert, Fairview, Sidney, West Glendive, Richey, and Glendive are predicted to face inadequate public services by 1991 even without development. Development of the Redwater II mine would further worsen inadequate service situations in these communities.

Because of its population base, economic diversity, and lack of relative isolation, Glendive and West Glendive would be much better prepared to absorb the effects of development in the tract than would Circle.

Circle and McCone counties have no experience with development and are relatively homogenous socially. An increase of 50 percent of the baseline population would constitute a high level of growth for the community to absorb. While disruptions might typically occur during the short-term, it is also expected that the presence of roughly 400 persons in Circle in addition to the baseline forecast during the long-term would have substantial effects on the social structure of that area.

Quality of life in McCone County would be affected noticeably by presence of an active mine. Since the social environment would be more complex than presently exists or would exist without mining, the informal, supportive, and trusting atmosphere would be adversely affected as new residents enter the area. Glendive and West Glendive, while attracting a large portion of incoming population attached to the development, would likely absorb these persons without undue stress or change in the social environment.

It is uncertain as to whether retail firms would be attracted to Circle, based on population changes. The lack of retail opportunities, perceived by residents as a major problem of living in the area would not be necessarily altered.

Agriculture

Developing the coal at the Redwater II mine would have a significant short-term impact on individual agricultural operations in the area. By the end of the mine life, 20,246 acres of the tract would be disturbed, and 160 additional acres would be used for mine facilities.

An average of 106 acres of cropland, excluding summer fallow, would be removed from production each year. This cropland would be out of production ten to fifteen years, with a maximum of 1,067 to 1,622 acres out of production in any one peak mining year. The maximum annual loss would range from 30,303 to 46,065 bushels of wheat.

Peak mining year disturbance of 259 acres of hayland would result in a maximum annual loss of 259 tons of hay production.

An average of 309 acres of rangeland would also be removed from production each year, resulting in an average loss of 86 AUMs (animal unit months). This rangeland would be out of production ten to fifteen years, with a maximum of 3,104 to 4,718 acres of out production in any one peak mining year. The maximum annual loss would range from 860 to 1,307 AUMs.

Regionally, these losses would not significantly reduce agricultural production. However, individual operators would be moderately to severely affected by mining disrupting their farming/ranching plans.

An average of 309 acres of rangeland would be removed from production each year.

FACILITY ANALYSIS

The likely use of coal mined from the tract would be to fire an electric power generating plant located near the mine.

Agriculture

Approximately 600 acres for the facility site would be taken out of agricultural production. Using a worst-case analysis, 8,520 bushels of wheat would be lost annually during the life of the power plant (based on current land use).

A short-term disruption of 12 acres per mile would result during construction of an undetermined length of water pipeline. Roadways would disturb 14.5 acres per mile. A railroad spur would eliminate agriculture on 18 acres per mile for the entire life of the facility.

Potential negative impacts to vegetation and to livestock exist downwind from coal conversion facilities due to nitrogen oxides, sulfur dioxide, and particulate matter (West-Central North Dakota Regional Environmental Impact Study on Energy Development, 1978). These negative impacts would be analyzed in detail by the state permitting authorities during their review of facility permit applications.

Water

Water requirements for an electric power facility are approximately 13,000 acre-feet per year. The likely source of the water would be Fort Peck Reservoir. Present regulations require state approval of disposal sites for facility wastes of ash, sludge, and water.

Recreation

Recreation facilities in the region (community camping and picnic areas, Fort Peck Reservoir, and Charles M. Russell National Wildlife Refuge) are expected to receive the bulk of recreation demand from the projected increased population. The social attitude survey revealed a concern for existing recreation facilities. It was also stated that an increase in population might result in the upgrading of currently marginal recreation facilities.

Wildlife

Wildlife impacts associated with the electric power facility could occur through destruction of habitat and increase in human population. The removal of vegetation for a 600-acre electric power facility and the expansion of urban areas, highways, and railroads would prevent or reduce the use of an area by wildlife regardless of the type of vegetation removed. Based on existing information, the Redwater River occurs on the south and east of the tract contains most of the valuable wildlife habitat, and provides fishing for nearby residents.

Powerlines, pipelines, and access roads could be constructed in key wildlife areas, with partial or total destruction of habitat. Other anticipated impacts include eagle electrocutions on powerlines, migratory bird deaths from striking powerlines close to wetlands, road kills along transportation routes through wildlife areas, harassment of wildlife by off-road vehicle use, and increased poaching. These impacts, along with habitat destruction, would result in decreased wildlife populations in the area. Wildlife oriented recreation such as hunting and observation would have to be sought elsewhere.

Poaching and road kills have increased dramatically in areas of North Dakota, Montana, Wyoming, and Colorado where energy development has occurred. The problem is compounded in areas where transportation corridors go through wildlife habitat areas and when employee shift changes coincide with wildlife feeting periods. This situation could occur in the tract area.

Taking water from shallow bays in Fort Peck Reservoir could have significant adverse impacts. These areas are prime nursery and spawning areas for sport, commercial, and forage fish. Eggs and young fish would occasionally be removed from the bay along with the water.

Aesthetics

The visual impact would be the penetration of the skyline by the facility, as seen from communities and major transportation corridors. The highly visible 600-foot stack—which could be seen from thirty or more miles away—would elicit a response either positive or negative. The dominance of the facility in the landscape could be perceived as a loss of amenity through impairment of the landscape for the 40-year expected life of the facility.

Economic and Social

Construction and operation of the Redwater II power plant would result in impacts upon services in some communities. Glendive, Bloomfield, Richey, Lindsay, West Glendive, and Circle would experience increases in both population and employment.

Peak employment during the construction phase is expected to occur in 1987 at 2,617 employees, with full operations employment expected in 1993 at 900 employees. By 1987, the above communities would experience an inadequate level of one or more community services as a direct result of the peak construction employment/population levels. Richey, for example, would have inadequate police protection as a result of population growth. Even without development, Brockway would have an inadequate level of all community services by 1987. A facility-related population influx in this community would worsen service inadequacies.

Full operation of the power plant (1993 and beyond) is also expected to result in impacts to community services. Savage would have inadequate police protection due to the population influx associated with facility operation. Even without tract development, Bloomfield, Richey, Lindsay, West Glendive, Circle, and Brockway are forecasted to face inadequate public services by 1991.

Social effects of the proposed power plant would be distributed through Dawson, Richland, and McCone counties. Eighty-seven residents of this three-county area were contacted by BLM in a random survey and asked about their feelings toward a power plant. Almost three-fourths of the persons contacted expressed support for such a plant. Support was not unqualified, however, as concern toward air quality, surface water protection, and local social and administrative problems were identified as issues by these persons.

Throughout the three-county area, some residents would be in a position to take advantage of the benefits of a power plant, while others would be unable to share in the benefits. All residents would face a changed social environment. This environment could be perceived less predictable, more stressful, more diverse, more impersonal, and, in general, less satisfying than the one that presently exists or the one that would exist

without development. Those who could take advantage of coal development would include local merchants, persons who have or would acquire industrial job skills, and persons who are looking for work.

A power plant would result in population growth levels in Dawson, McCone and Richland counties that would stretch or exceed the area's capacity to cope with them. This would be most pronounced during the construction period in Glendive, West Glendive, and Richey. The changes would persist in the future but not as significantly. The operation phase would lead to greater long-term stability. In Richland County, Sidney would experience significant growth during construction, with virtually no change from baseline during the operation phase. Sidney, Glendive-West Glendive, and, to a lesser extent, Richey would be better prepared to deal with such growth, both socially and administratively, than would McCone County.

McCone County is an agricultural area with limited industrialization experience. Its existing population is not particularly diverse occupationally, and the population level is quite low. An influx of workers could simply overwhelm the communities of Circle and Brockway. This would be particularly acute during the construction phase, as large numbers of newcomers enter these communities. The absorptive capacity of Circle and Brockway, and the county as a whole, would be clearly exceeded. Managing the problems attached to such rapid growth would require extraordinary skill on the part of local administrators.

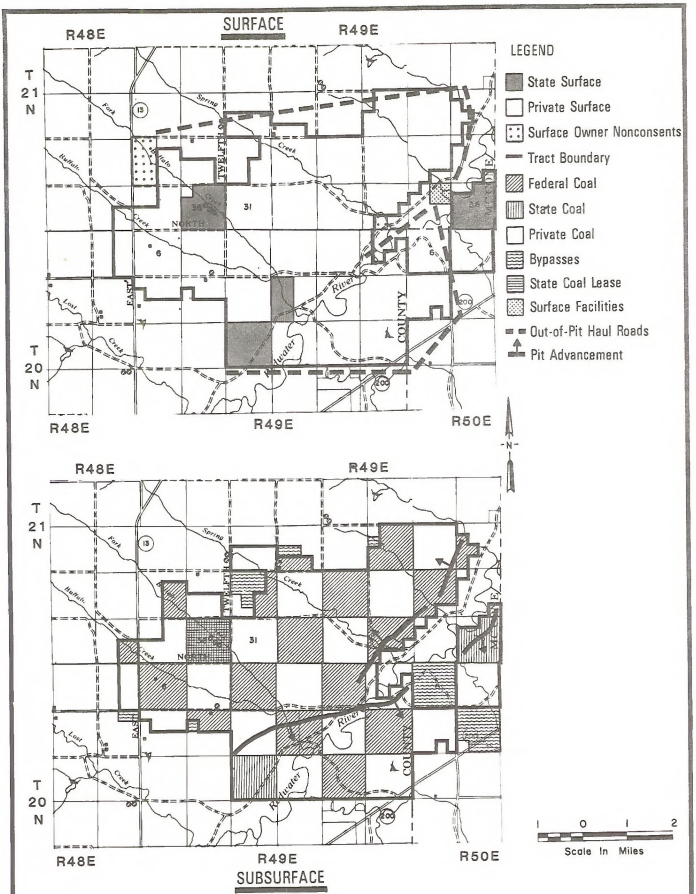
During the operation period of the plant, the effects would be less noticeable, but the social structures (political, interactive, leisure, organizational, and religious) of these communities would be significantly and persistently changed. The change in the local economic base would result in the reduction in the prestige and prominence of the agricultural sector and persons attached to it. This would be true in Dawson and Richland counties, but—because of its present environment—would be most pronounced in McCone County.

In summary, Dawson and Richland counties (particularly Glendive-West Glendive, Richey, and Sidney) would experience substantial short-term social effects. In McCone County, in the communities of Brockway and Circle, the changes would be more significant and would last longer. Energy development would bring with it some economic stability that presently does not exist in these agricultural areas. This could be a major benefit of industrialization to persons and communities presently faced with an unpredictable climate and agricultural market.

Air Quality

Probable impacts to air quality were analyzed to determine compliance or noncompliance with Ambient Air Quality Standards and Prevention of Significant Deterioration (PSD) Standards for Class I and Class II areas.

With the use of a screening dispersion model for emissions from an electric power facility sited on the Redwater II tract, it has been forecast that the facility would not violate Montana or North Dakota Ambient Air Quality Standards and would not violate PSD Standards for Class I and Class II areas. The increased concentration levels of TSP, NOx, and SO_2 resulting from the facility were forecast to be below the detectable level at the border of the Class I area of the Theodore Roosevelt National Park in North Dakota.



REDWATER TRACT II

REDWATER II
SITE-SPECIFIC SUMMARY MATRIX

COAL ECONOMICS

TRACT RANKING SUBFACTORS	PRESENT SITUATION	COMMENTS	INFORMATION SOURCE
Coal Quality	Lignite, 6,750 Btus/lb. Sulfur 0.2 percent.		USGS
Coal Quantity	Recoverable - 286.8 million tons Reserves - average 18,500 ton/acre		USGS
Coal conservation and Maintenance of Production	90% recovery rate - New production		USGS
Energy Production	End-use possible mine mouth power plant.	Net energy analysis 1 Btu expended for 197 Btus produced.	BLM, USGS
Likelihood of Leasing and Development	Depends on market driven forces. Two expressions of leasing interest received.		BLM

IMPACTS TO THE ENVIRONMENT

TRACT RANKING SUBFACTORS	PRESENT SITUATION	ANTICIPATED EFFECT OF LEASING DEVELOPMENT	SIGNIFICANCE OF ANTICIPATED IMPACT
Air Quality	Excellent	Increase in total suspended particulates.	Insignificant
Minerals Other than Coal	Potential for oil and gas development.	Delay of exploration for oil and gas within the tract.	Significant
Water	Moderate chemical quality.	Decrease in the chemical quality of water passing through reclaimed soils.	Insignificant
Wildlife	Most wildlife values along Redwater River which may be on alluvial valley floor.	Increased poaching and disturbance.	Significant
Cultural Features	Inventory incomplete. Inventory under contract.	Unknown but potentially significant loss of knowledge	Significant
Amenity Values	High aesthetic quality, low scenic value. Seen from Highways 20 and 13.	Short duration views of disturbed areas from highways.	Insignificant
Special Management Areas/ Unique Resource Impacts	No wilderness, special management or ACEC's in area.	Precludes designation options in the future.	Insignificant
Other Land Use & Transportation	Activity is new to the area.	Displacement of agricultural use. Relocation or bypass of transportation and utilities.	Insignificant

TRACT RANKING SUBFACTORS	PRESENT SITUATION	ANTICIPATED EFFECT OF LEASING/DEVELOPMENT	SIGNIFICANCE OF ANTICIPATED IMPACT
Reclamation Potential	Approximately 49% of the tract has poor reconstruction potential	Salinity increases due to intermixing of soil horizons.	Significant
Unsuitability Criteria	Buffer zones and cultural deferred to mine plan. Alluvial valley floors to OSM; federal and state listed endangered species, eagle nests, roost and concentration areas, falcon nesting sites, migratory birds, and state resident fish and wildlife need further study.	Not applicable	Not applicable
	SOCIAL AND ECONOMIC		
Economic Changes	Population and employment levels forecasted relatively stable through 2000 A.D. Regional income to increase moderately.	Glendive, Lambert, Savage, and Circle would experience population increases. Regional income will increase slightly.	Significant
Community Service Assessment	Most services adequate or barely adequate. Resident perception of problem areas include medical care, recreation/entertainment, roads/traffic.	One or more services would become inadequate in Glendive, Lambert, Savage, and Circle.	Significant
Public Attitudes	Generally support (conditionally) coal development in Dawson, Richland, and McCone Counties.	Not Applicable	Not Applicable
Lifestyle and Social Structure	Most residents favor the informal, small town atmosphere.	Some slight deterioration of quality of life.	Significant
Agricultural Operations	There are 7,806 acres of existing cropped land. Irrigated lands are adjacent to bottomlands.	Average annual loss of 106 acres (3,010 bu. of wheat) excluding 3,279 acres of summer-fallow, Maximum loss/peak mining year=1,067 to 1,622 acres (30,303 to 46,045 bu. of wheat).	Significant
Consistency with other Plans and Policies	BLM - Management Framework Plan of 1979.	Not Applicable	Not Applicable

SOUTHWEST GLENDIVE

The Southwest Glendive tract is approximately ten miles southwest of Glendive in Dawson County, Montana. The land is used primarily for farming and ranching.

The tract contains about 12 percent (174 million tons) of the federal coal under current consideration in the Fort Union Region. The one economically recoverable seam of lignite coal in the tract averages from 10 to 19 feet thick. Overburden reaches a maximum thickness of about 150 feet.

The generic mining plan calls for a surface mine using draglines, electric shovels, bottom-dump coal haulers, scrapers, and other support equipment. An indirect liquefaction plant would likely utilize the mined coal.

The tract contains one inactive mine. The nearest active mine is the Savage mine, which is 40 miles northeast of the tract. The tract lies on the western flank of the Williston Basin, where oil and gas exploration, discovery, and production are increasing. The tract contains no producing wells.

Terrain found in the northern portion of the tract.

SITE SPECIFIC ANALYSIS

Minerals

Because the tract is located in the Williston Basin, it has a potential for oil and gas development. Coal mining and associated operations preclude or inhibit certain phases of oil and gas exploration. Coal mining could delay exploration activities for six to eight years or even for the entire productive life of the mine.

Wildlife

If the seven known sharp-tailed grouse dancing grounds and one important woody draw are declared unsuitable for surface mining, impacts to wildlife would be reduced. If not, the destruction of the dancing grounds would be a significant impact. This would reduce the population in the entire area surrounding the tract and consequently reduce the opportunity for wildlife-oriented recreation. Destruction of the woody draw would be a long-term irreversible impact, as reclamation of these areas has not yet been proven.

The northern pike population of Upper Sevenmile Creek would be destroyed. The pike escape from ponds above the creek. This would be a moderately significant short-term impact if the drainage could be adequately re-created.

Cultural

Information on cultural resource values in the area is scarce. The tract could contain significant archaeological or historical sites and/or artifacts. Impacts to these potential resources can be significant unless more information is collected to indicate otherwise. Inventory being contracted now would raise the level of confidence that loss would or would not occur. The loss of identified values, if any exist, would be long-term and irreversible.

Reclamation

Intermixing of calcareous horizons would increase the salinity of the soil and make reestablishment of vegetation more difficult. Special handling of overburden, which would increase coal mining costs, may be required. More information is required, and the salinity problem should be resolved in the mining plan.

Economic and Social

Construction and operation of a mine in the Southwest Glendive tract would result in minor impacts to services in some communities. Glendive, Lambert, and Savage, Montana would experience increases in both population and employment.

Peak employment during the construction phase of the mine is expected to occur in 1986 at 265 employees, with full operations employment expected in 1991 at 450 employees. Glendive, Lambert, and Savage would experience an inadequate level of one or more community services as a direct result of the peak construction employment/population levels. Glendive's water supply, for example, would be inadequate. Some community services in Sidney, Fairview, Richey, and West Glendive would be inadequate by 1986, even without mine development. A mine-related population influx would worsen service inadequacies in these communities.

Full operation of the mine (1991 and beyond) would

also impact community services. Glendive would have inadequate police protection as a direct result of the population influx resulting from mine operation. Sidney, Fairview, Lambert, Savage, Richey, and West Glendive in the study area are likely to have inadequate public services by 1991 even without tract development. Development of the Glendive mine would further worsen service inadequacies in these communities.

The majority of the social effects would fall in Glendive and West Glendive. During the construction period of the mine, roughly 500 new persons would be expected to reside in those two communities. During the operation phase, the increase over the baseline exceeds 1,100 persons. While these numbers are significant it should be considered that Glendive and West Glendive together are quite large in population and could absorb relatively large numbers of persons without undue disruption of ongoing local social processes such as religious behavior, political behavior, patterns of interaction, community cohesion, and so on.

In Sidney, roughly 100 persons would be attached to development in the short-term construction phase; during the operation phase, about 130 persons would be residing in the community. Given Sidney's size and social and economic diversity, these new residents would not be significant, representing only a one to two percent increase over the baseline. There would be little noticeable effect on Sidney that could be attributed to development of the tract.

Since residents of both Richland and Dawson counties indicate that the existing social atmosphere is the best thing about living in the areas, it would be expected that development of the tract would have some adverse effect on Glendive, West Glendive, and Sidney. A faster pace of life, more traffic, increasingly formal patterns of interaction, and similar changes would occur for some residents due to development. It is possible that some of the existing deficits in medical care and retail opportunities would be positively affected by development as new persons and firms might be attracted to the area.

Agriculture

Developing the coal in the Glendive tract would have a significant short-term impact on individual agricultural operations in the area. By the end of the mine life, 21,308 acres of the tract would be disturbed, and an additional 160 surface acres would be used for mine facilities.

An average of 149 acres of cropland, excluding summer fallow, would be taken out of production each year. This cropland would be out of production ten to fifteen years, with a maximum of 1,481 to 2,245 acres out of production in any one peak mining year. The maximum annual loss would range from 42,060 to 63,758 bushels of wheat.

Peak mining year disturbance of 1,105 acres of hayland would result in a maximum annual loss of 1,105 tons of hay production.

An average of 405 acres of rangeland would also be removed from production each year, resulting in an average loss of 79 AUMs (animal unit months). This rangeland would be out of production ten to fifteen years, with a maximum of 4,013 to 6,081 acres of production in any one peak mining year. The maximum annual loss would range from 783 to 1,186 AUMs.

Regionally, these losses would not significantly reduce agricultural production, but some individual operators would be significantly impacted.

An average of 405 acres of rangeland would be removed from production each year.

FACILITY ANALYSIS

The coal mined from the tract would probably be used in an indirect liquefaction facility located near the mine. Approximately 960 acres would be taken out of agricultural production for the facility site. Using a worst-case analysis, 13,632 bushels of wheat would be lost annually during the life of the plant (based on current land use).

A short-term disruption of 12 acres per mile would result during construction of an undetermined length of water pipeline. Roadways would disturb 14.5 acres per mile. A railroad spur would eliminate agriculture on 18 acres per mile for the entire life of the facility.

Potential negative impacts to vegetation and to livestock exist downwind from a coal conversion facility due to nitrogen oxides, sulfur dioxide and particulate matter (West-Central North Dakota Regional Environmental Impact Study on Energy Development, 1978). Such negative impacts would be analyzed in detail by the state permitting authorities during their review of facility permit applications.

Water

Water requirements for an indirect liquefaction plant are approximately 11,500 acre-feet per year. The likely source of water would be Fort Peck Reservoir. Present regulations require state approval of disposal sites for facility wastes of ash, sludge and water.

Recreation

Recreation facilities in the region (community camping and picnic areas, Fort Peck Reservoir, and Charles M. Russell National Wildlife Refuge) are expected to receive the bulk of recreation demand from the projected increased population. The social attitude survey revealed a concern for existing recreation facilities. It was stated also that an increase in population might result in the upgrading of currently marginal recreation facilities.

Wildlife

Wildlife impacts associated with the indirect liquefaction facility could occur in two areas: 1) impacts from destruction of habitat and 2) impacts from the increase in human population. The removal of vegetation for a 960-acre facility and the expansion of urban areas, highways, and railroads would prevent or reduce the use of an area by wildlife, regardless of the type of vegetation removed. Native prairie and sharp-tailed grouse dancing grounds may exist on the tract. A wildlife inventory is to be completed this fall (1981).

Powerlines, pipelines, and access roads could be constructed in key wildlife areas, with partial or total destruction of habitat. Other anticipated impacts include eagle electrocutions on powerlines, migratory bird deaths from striking powerlines close to wetlands, road kills along transportation routes through wildlife areas, harassment of wildlife by off-road vehicle use, and increased poaching. These impacts, along with habitat destruction, would result in decreased wildlife populations in the area. Wildlife oriented recreation such as hunting and observation would have to be sought elsewhere.

Poaching and road kills have increased dramatically in areas of North Dakota, Montana, Wyoming, and Colorado where energy development has occurred. The problem is compounded where transportation corridors traverse important wildlife areas and when employee shift changes coincide with wildlife feeding periods. This situation could occur in the tract area.

Taking water from shallow bays in Fort Peck Reservoir could have significant adverse impacts. These areas are prime nursery and spawning areas for sport, commercial, and forage fish. Removal of water would involve removal of young fish or eggs.

Aesthetics

The visual impact would be the penetration of the skyline by the facility, as seen from communities and major transportation corridors. The 500-foot stack could potentially be seen thirty or more miles away and would evoke a response either positive or negative. The dominance of the facility in the landscape could be perceived as a loss of amenity through impairment of the landscape for the 40-year expected life of the facility.

Economic and Social

Construction and operation of the liquefaction facility would result in impacts upon services in some communities. Lindsay, West Glendive, Glendive, Brockway, Richey, Circle, Lambert, Fairview, Sidney, and Savage would experience increases in both population and employment as a result of development.

Peak employment during the construction phase is expected to occur in 1987 at 2,617 employees, with full operations employment expected in 1993 at 900 employees. The ten communities mentioned above would experience an inadequate level of one or more community services as a direct result of the peak construction employment/population levels. Richey, for example, would have inadequate sewage collection as a result of population growth.

Full operation of the facility (1993 and beyond) is also expected to result in impacts to community services. Savage, Lindsay, Richey, Glendive, West Glendive, and Lambert would have inadequate services due to the population influx associated with facility operation. Brockway, Circle, Sidney, and Fairview are forecasted to have inadequate public services by 1991 even without tract development. Development of the facility would further worsen service inadequacies in these communities.

The liquefaction facility would have both short- and long-term social effects in the five-county (Dawson, McCone, Richland, Wibaux, and Golden Valley) area. In these counties, public support for a coal conversion facility was quite strong, as indicated by the BLM-sponsored interviews in a random sample survey. The exception was Golden Valley County, where more than one-half of the contacted residents expressed opposition. In the other counties, about two-thirds to three-fourths of the respondents indicated that they support such facilities locally. Across the five-county area, the major concern of residents was air quality, followed by concern for their respective communities' ability to absorb rapid population growth and change. Recognition by many residents that their communities would be both larger and more diverse appears to be common.

A higher proportion of Richland and Dawson county residents may be able to take direct financial advantage

of facility construction than are persons in McCone, Wibaux, and Golden Valley counties. Some industrialization has already occurred in Richland and Dawson counties, and more persons probably possess the necessary skills to be employed in the energy industry than in the other areas. In all affected communities, residents who are unable or unwilling to participate in the increased economic activity due to industrialization would experience rapidly changing communities without participating in the distribution of benefits.

Particularly during the short-term construction phase of the Glendive facility, residents would face an altered social environment. Since the residents of these communities strongly endorsed the existing social atmosphere, overall satisfaction with community conditions would very likely decline and many individuals' perceived quality of life would also decline. As rapid population growth and social changes occur, this would be mitigated for many persons as they would enjoy enhanced financial conditions due to the plant. Others, however, would neither share in the benefits nor be able to avoid the consequences of rapid growth.

The projected population effects of a Glendive facility are centered in Glendive and West Glendive (Dawson County), but other communities in the area would also be significantly affected during the construction phase. Circle, Sidney, Fairview, Savage, Wibaux, and Beach would each have significant population growth (above baseline) due to the facility. Communities in Richland County are in a better position to absorb this growth than are communities in McCone, Wibaux, and Golden Valley counties. The latter counties have had limited experience with industrial development and are relatively quite low in population.

If the West Glendive liquefaction plant is built, the population of Glendive and West Glendive will increase markedly. Although these towns are fairly diversified, relatively large, and experienced in industrial development, the projected growth may well be more than the residents and officials could adjust to readily. Six thousand new residents (above baseline projections) is a substantial number of persons even in communities as large as Glendive and West Glendive. During the construction phase, the communities would be more crowded, noisy, stressful, and—to many long-term residents inexperienced with more urban situations—frightening. Many of these long-term residents would be protected by existing social networks, but the community changes would be largely unavoidable as large numbers of persons enter the communities. Conflicts between long-term and new residents could be expected. The cultural lives of the communities would be subjected to large-scale disruptions, at least during the construction phase.

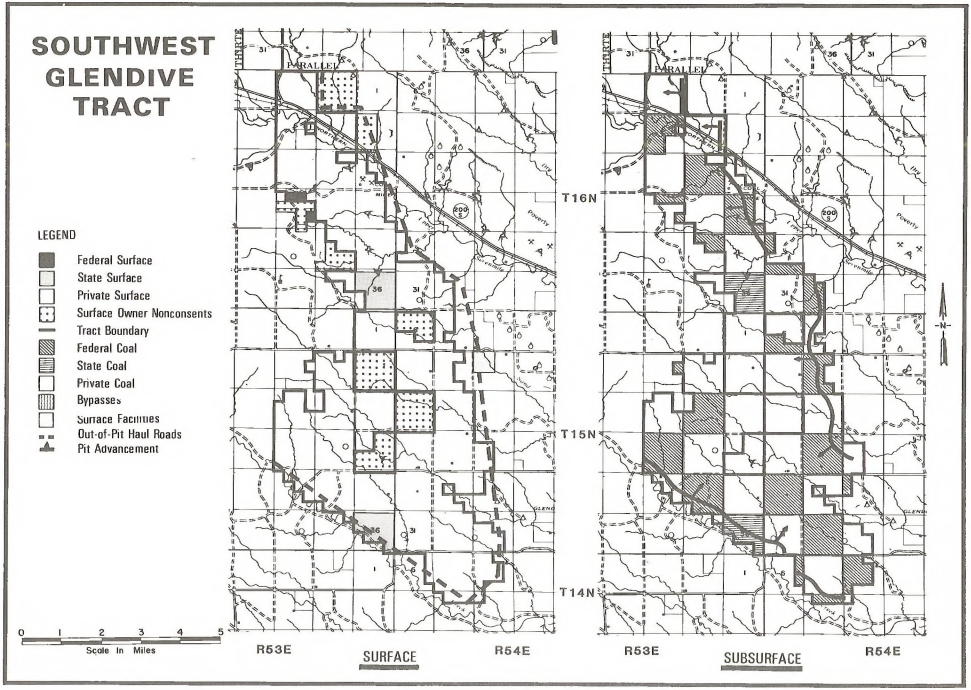
Once such a facility is constructed, patterns of interaction and relations between people and institutions should stabilize. The industrial employees would likely settle in Glendive and West Glendive; thus, the relative influence of the agricultural sector in Dawson County would be diminished. These changes should not be particularly significant. Social changes would be most pronounced throughout the five-county area during the construction of the plant.

Air Quality

Probable impacts to air quality were analyzed to predict compliance or noncompliance with Ambient Air Quality Standards and PSD Standards for Class I and Class II areas.

With the use of a screening dispersion model for emissions from an indirect liquefaction facility sited on the Southwest Glendive tract, it has been forecast that the facility would not violate Montana or North Dakota Ambient Air Quality Standards and would not violate PSD standards for Class I and Class II areas. The increased concentration levels of TSP, NOx, and SO_2 resulting from the facility were forecast to be below the detectable level at the border of the Class I area of the Theodore Roosevelt National Park in North Dakota.

SOUTHWEST GLENDIVE TRACT



SOUTHWEST GLENDIVE
SITE-SPECIFIC SUMMARY MATRIX

COAL ECONOMICS

TRACT RANKING SUBFACTORS	PRESENT SITUATION	COMMENTS	INFORMATION SOURCE
Coal Quality	Lignite, 6,492 to 7,005 Btus/lb. Average 6,733 Btus/lb. Sulfur 0.27% to 0.54% - Average 0.3%.		USGS
Coal Quantity	Recoverable - 415.3 million tons Reserves - average 25,600 ton/acre		USGS
Coal conservation and Maintenance of Production	90% recovery rate - New production		USGS
Energy Production	End-use possible mine mouth gasification plant.	Net energy analysis 1 Btu expended for 179 Btus produced.	BLM, USGS
Likelihood of Leasing and Development	Depends on market driven forces. Two expressions of leasing interest received.		BLM

IMPACTS TO THE NATURAL ENVIRONMENT

TRACT RANKING SUBFACTORS	PRESENT SITUATION	ANTICIPATED EFFECT OF LEASING/DEVELOPMENT	SIGNIFICANCE OF ANTICIPATED IMPACT
Air Quality	Excellent	Increase in total suspended particulates.	Insignificant
Minerals Other than Coal	Potential for oil and gas development.	Delay of exploration for oil and gas within the tract.	Significant
Water	Moderate chemical quality.	Decrease in the chemical quality of water passing through reclaimed soils.	Insignificant
Wildlife	Seven sharptail grouse dancing grounds on tract.	Would be destroyed. Significant increase in poaching and disturbance.	Significant
Cultural Features	Inventory incomplete. Inventory under contract.	Unknown but potentially significant loss of knowledge	Significant
Amenity Values	High aesthetic quality, low scenic value.	Few intermittant views of short duration from State Higway 20 S.	Insignificant
Special Management Areas/ Unique Resource Impacts	No wilderness, special management or ACEC's in area.	Precludes designation options in the future.	Insignificant
Other Land Use & Transportation	Activity is new to the area.	Displacement of agricultural use. Relocation or bypass of transportation and utilities.	Insignificant

TRACT RANKING SUBFACTORS	PRESENT SITUATION	ANTICIPATED EFFECT OF LEASING/DEVELOPMENT	SIGNIFICANCE OF ANTICIPATED IMPACT
Reclamation Potential	Approximately 46% of the tract has poor reconstruction potential	Salinity increases due to intermixing of soil horizons.	Insignificant
Unsuitability Criteria	Buffer zones and cultural deferred to mine plan. Alluvial valley floors to OSM; federal and state listed endangered species, eagle nests, roost and concentration areas, falcon nesting sites, migratory birds, and state resident fish and wildlife need further study.	Not applicable	Not applicable
	SOCIAL AND ECONOMIC		
Economic Changes	Population and employment levels forecasted relatively stable through 2000 A.D. Regional income to increase moderately.	Glendive, Lambert, and Savage would experience population increases. Regional income will increase slightly.	Significant
Community Service Assessment	Most services adequate or barely adequate. Resident perception of problem areas include medical care, recreation/entertainment, roads/traffic.	One or more services would become inadequate in Glendive, Lambert, and Savage.	Significant
Public Attitudes	Generally support (conditionally) coal development in Dawson, and Richland Counties.	Not Applicable	Not Applicable
Lifestyle and Social Structure	Most residents favor the informal, small town atmosphere.	Some slight deterioration of quality of life.	Significant
Agricultural Operations	There are 8,964 acres of existing cropped land. Irrigated lands are adjacent to bottomlands.	Average annual loss of 149 acres (4,232 bu. of wheat) excluding 3,379 acres of summer-fallow, Maximum loss/peak mining year=1,481 to 2,245 acres (42,060 to 63,758 bu. of wheat).	Significant
Consistency with other Plans and Policies	BLM - Management Framework Plan of 1979.	Not Applicable	Not Applicable

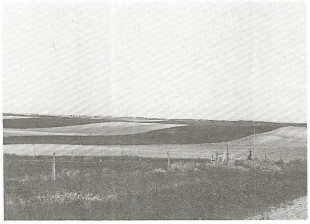
NORTH WIBAUX-BEACH

The North Wibaux-Beach tract is in Golden Valley County, North Dakota and Wibaux County, Montana, about three miles southwest of Beach, North Dakota. The land is primarily used for farming and ranching.

The tract contains 9 percent (135 million tons) of the federal coal under current consideration in the Fort Union Region. One economically recoverable seam of lignite coal, which averages 27.6 feet in thickness, underlies the tract. Overburden ranges from 150 to 200 feet in thickness.

The generic mining plan calls for a surface mine using draglines, electric shovels, bottom-dump coal haulers, scrapers, and other support equipment. An on-site gasification plant would probably utilize the mined coal.

The tract includes three inactive mines. The nearest active mine is Knife River's Savage Mine, which is 40 miles northwest of the tract. The tract lies just east of the inactive Wibaux Oil and Gas field and is in the Williston Basin, where petroleum exploration, discovery, and production are increasing. The tract contains no producing oil or gas wells.



Farming and ranching are the major uses of the land.

SITE SPECIFIC ANALYSIS

Air Quality

An air quality modeling analysis was undertaken. The projected air quality impacts resulting from the mine operation were compared to applicable state and federal ambient air quality standards as well as state Prevention of Significant Deterioration (PSD) regulations.

A mine on the North Wibaux-Beach tract was shown to comply with the state ambient air quality standards and the Class II PSD annual standards; however, the 24-hour particulate standards (which cannot be exceeded more than once per year) could possibly be violated during times of strong winds and peak production.

Minerals

Because the tract is in the Williston Basin, it has a potential for oil and gas development. Coal mining and associated operations preclude or inhibit certain phases of oil and gas exploration and development. Coal mining could delay exploration activities for six to eight years or even for the entire productive life of the mine.

Interest in this tract for oil and gas exploration and development is high.

Wildlife

Mining would eliminate the unique unfarmed wildlife habitat on the tract. Aquatic habitat, such as the wetlands found along the Montana-North Dakota border, also would be lost.

Cultural

Information on cultural resource values in the area is scarce. The tract could contain significant archaeological or historical sites and/or artifacts. Loss of these resources (due to mining) can be considered significant, unless more information is collected to indicate otherwise. Inventory being contracted now would raise the level of confidence that loss would or would not occur. The loss of identified values, if any exist, would be long-term and irreversible.

Land Use

Mining and town expansion would displace the dominant agricultural use of the area. Roads and utilities would be relocated or bypassed and would inconvenience persons who are dependent on them in their present location.

Reclamation

Some instability problems such as area-wide settling or localized subsidence could occur. The extent of these problems would depend on reclamation planning and success. Over the long run, the original agriculture productivity level of the soils should return to the tract.

Economic and Social

Construction and operation of the North Wibaux-Beach mine would result in significant impacts to services in some communities in the area. Wibaux, Lambert, and Savage, Montana and Beach, Golva, and Sentinel Butte, North Dakota would have significant increases in both population and employment due to development of the tract.

Population of several other communities in western North Dakota and eastern Montana would also increase as a result of tract development; however, assessments by the BLM and by city-county and regional planners show that these increases would be so small (often less than one percent of the baseline population), that they would not significantly affect community service adequacy.

Peak employment during the construction phase of the North Wibaux-Beach mine is expected to occur in 1987 at 260 employees, with full operations employment expected in 1993 at 440 employees. By 1987, Wibaux, Lambert, and Savage, Montana and Beach, North Dakota would experience an inadequate level of community services as a direct result of the peak construction employment/population levels associated with construction of the mine. Some community services in Golva and Sentinel Butte, North Dakota would become inadequate by 1987 even without tract development. Tract-related population influx would further worsen these inadequate service situations.

Full operation of the North Wibaux-Beach mine (1993) is also expected to result in serious impacts to area communities. Wibaux, Beach, Golva, and Sentinel Butte would all have one or more service inadequacies as a direct result of the population influx associated with mining operation. Some community services in Lambert and Savage, Montana would become inadequate by 1993 without tract development. Tract-related population growth would result in additional strains on these services.

The rural areas of Wibaux, Golden Valley, and Billings counties would also receive tract-related population influx (though at a much lower level than the communities). This population growth would result in additional demands on some of the services.

The social effects of developing this tract would be centered in Wibaux and Golden Valley counties, particularly the communities of Wibaux and Beach. Both counties have limited economic diversity and have had population declines over the past several decades. Neither petroleum nor coal development has resulted in significant recent population increases. Community experience with the types of developments being proposed is limited.

For these reasons, temporary disruptions in the political, religious, educational, and family structures of these communities would be likely. However, these changes would not likely be pervasive among existing residents, and stability would be reestablished after the initial burst of growth. Adequate notification and collaboration between residents, local and state officials, and company representatives could—given the several years available to prepare for growth—further reduce the magnitude of the effects.

Coal development presents an opportunity for these communities to diversify and stabilize their economic circumstances over the long run. Given the present size and composition of existing populations, the transition period of moderately rapid change would be somewhat more difficult for residents in these areas than for persons living in larger, more complex communities. In Wibaux and Golden Valley counties, economic growth and stability would, at least initially, result in some social instability. This instability should be neither persistent nor long-lived. Population growth over the short run would likely lead to a decline in the residents' endorsement of the social atmospheres of Wibaux and Golden Valley counties. Informality, lack of stress, and lack of crowding would be less evident. These changes would not be particularly significant but would be noticeable.

Those area characteristics described in negative terms by residents in a BLM random sample survey, particularly crime and shortages of medical care, would probably be more evident, further reducing satisfaction with the area.

Agriculture

Mining the tract would require taking an average of 500 acres out of agricultural production each year. By the end of the mine life, 19,768 acres of the tract would have been disturbed.

An average of 341 acres of cropland, excluding summer fallow, would be removed from production each year, resulting in an average annual loss of 10,025 bushels of wheat. This cropland would be out of production ten to fifteen years, with a maximum of 3,414 to 5,189 acres out of production in any one peak mining year. In total, the maximum annual loss would range from 100,372 to 152,557 bushels of wheat.

An average of 25 acres of rangeland would also be removed from production each year, resulting in an average loss of 13 AUMs (animal unit months). This rangeland would be out of production ten to fifteen years, with a maximum of 259 to 394 acres out of production in any one peak mining year. In total, the maximum annual loss would range from 130 to 197 AUMs.

These losses would not significantly reduce regional agricultural production; however, individual operators could be severely impacted.

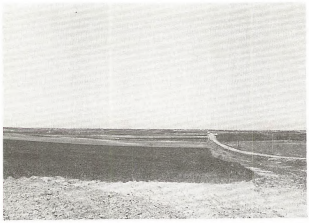
FACILITY ANALYSIS

The coal mined from the tract would probably be used in a gasification plant located near the mine.

Agriculture

Approximately 960 acres for the facility site would be

taken out of agricultural production. In a worst-case analysis, 13,900 bushels of wheat would be lost annually for the life of the gasification plant (based on current land use).



Mining would take an average of 500 acres of agricultural land annually out of production.

A short-term disruption of 12 acres per mile would result during construction of an undetermined length of water pipeline. Roadways would disturb 14.5 acres per mile. A railroad spur would eliminate agriculture on 18 acres per mile for the entire life of the gasification plant.

Potential negative impacts to vegetation and to livestock exist downwind from a gasification plant due to nitrogen oxides, sulfur dioxide, and particulate matter (West-Central North Dakota Regional Environmental Impact Study on Energy Development, 1978). These negative impacts would be analyzed in detail by the state permitting authorities during their review of facility permit applications.

Water

Water requirements for the North Wibaux-Beach gasification plant are predicted to be approximately 10,000 acre-feet per year. The likely source of water would the Yellowstone River. Present regulations require state approval of disposal sites for facility wastes of ash, sludge, and water.

Recreation

Recreation facilities in the region (community camping and picnic areas, Fort Peck Reservoir, and Charles M. Russell National Wildlife Refuge) are expected to receive the bulk of recreation demand from the projected increased population.

Wildlife

Wildlife impacts associated with the gasification plant could occur in two ways: 1) impacts from destruction of habitat and 2) impacts from the increase in human population. Removal of vegetation for a 960-acre gasification facility and the expansion of urban areas, highways, and railroads would prevent or reduce the use of an area by wildlife regardless of the type of vegetation removed.

Powerlines, pipelines, and access roads could be constructed in key wildlife areas with partial or total destruction of habitat. Other anticipated impacts include eagle electrocutions on powerlines, migratory bird deaths from striking powerlines close to wetlands, road kills along transportation routes through wildlife areas, harassment of wildlife by off-road vehicle use, and increased poaching. These impacts, along with habitat destruction, would result in decreased wildlife populations in the area. Wildlife oriented recreation such as hunting and observation would have to be sought elsewhere.

Poaching and road kills have increased dramatically in areas of North Dakota, Montana, Wyoming, and Colorado where energy development has occurred. The problem is compounded where transportation corridors are in important wildlife areas and when employee shift changes coincide with wildlife feeding periods. This situation could occur in the tract area.

Aesthetics

The visual impact would be the penetration of the skyline by the facility as seen from communities and major transportation corridors. The 500-foot stack could potentially be seen 30 or more miles away and would evoke a response either positive or negative. The visual dominance of the facility could be perceived as a loss of amenity through impairment of the landscape during the 40 years of the expected life of the plant.

Economic and Social

Construction and operation of the gasification plant would result in impacts upon services in some communities due to population growth. Richey, West Glendive, Glendive, Lindsay, Sidney, Lambert, Savage, Fairview, and Wibaux, Montana and Golva, Sentinel Butte, and Beach, North Dakota would experience significant increases in population and employment as the result of the development of the facility.

Peak employment during the construction phase is expected to occur in 1987 at 3,200 employees, with full operations employment expected in 1991 at 1,050 employees. By 1987, the above communities would experience an inadequate level of one or more community services as a direct result of the peak construction employment/population levels.

Population growth associated with full operation of the North Wibaux-Beach facility (1991 and beyond) is expected to cause service inadequacies in Glendive,

Lambert, Savage, Fairview, and Wibaux, Montana and Golva, Sentinel Butte, and Beach, North Dakota. Even without tract development several community services would be inadequate in Lindsay, Sidney, West Glendive, and Richey, Montana by 1991. Development of the North Wibaux-Beach facility would add to the expected problems.

Patterns of residents' attitudes toward coal conversion facilities are highly variable across the four-county (Wibaux, Richland, Dawson, and Golden Valley) area. Based on interviews with eighty-four residents in a BLM random sample survey of the four-county area, support apparently is strongest in Richland County, where roughly three-fourths of the persons contacted favor such a plant or plants. At the opposite extreme, more than one-half of the Golden Valley County residents contacted expressed firm opposition to such a facility. Levels of support and opposition in Wibaux and Dawson counties fell between these two extremes. Only a very small number of Wibaux and Golden Valley County residents were contacted. Possible effects of a facility on air quality and the local social consequences of rapid population growth were dominant concerns throughout the four-county area.

Construction of the Wibaux-Beach facility would result in a variable distribution of benefits and costs among present and future residents. Persons with energy job skills, persons who could acquire these skills, persons outside the labor force who want jobs, and some local merchants clearly would benefit economically. Others would be adversely effected. They would experience a rapidly changed social environment without directly enjoying any of the economic benefits.

Throughout the four-county area, the small-town, relaxed, friendly social environment is the dimension of community life most appreciated by many residents. Construction of the North Wibaux-Beach plant would be associated with a radically different community atmosphere for the short term. Many persons likely would be less satisfied with their home communities than they would be should development not occur.

Glendive, Sidney, Wibaux, and Beach would receive most of the population growth caused by construction and operation of the North Wibaux-Beach facility. The relative number of new residents (above that expected without development) is quite high, particularly in Wibaux and Beach. The present and forecasted baseline populations in these two communities are quite low. The capacity of Wibaux and Golden Valley counties to absorb significant growth during the construction phase is uncertain. Both areas are agricultural, with small population bases, and have had little or no community experience with industrialization. Glendive and Sidney, by contrast, are somewhat better prepared to deal with such changes.

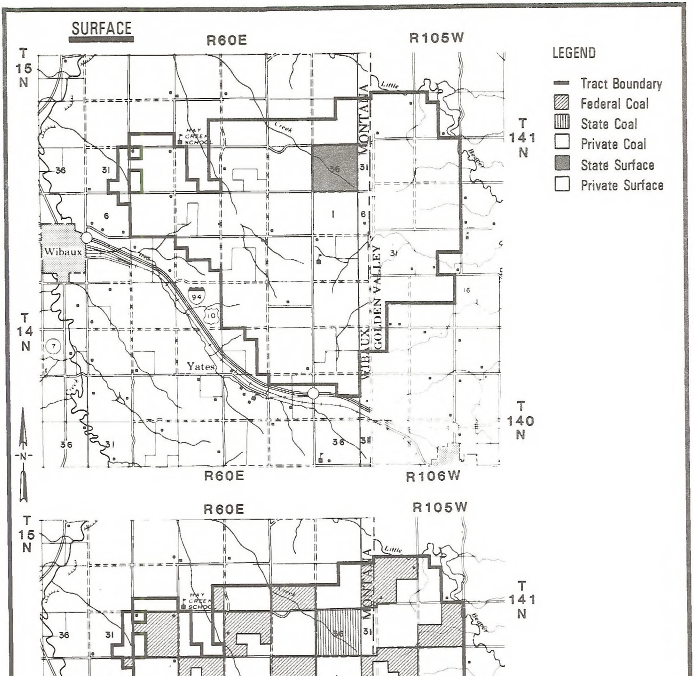
Beach, Golva, Sentinel Butte, and Wibaux would go through significant social changes due to the facility. During the construction phase Wibaux and Beach would be communities with substantial disorganization, stress, and poor match-ups between resident needs and public services and facilities. Major deficits should be expected in such areas as law enforcement, education, social services, and health care. Long-term permanent residents would likely be buffered to some extent by established social networks, but the magnitude of the changes in Beach and Wibaux would be of such scale that avoidance of social problems due to rapid growth would be most difficult.

After the arrival of the operational work force, stability would probably be reestablished in the four-county area, and only the communities of Wibaux, Beach, and Golva would likely display evidence of long-term, significant social changes. The long term changes—in the political, family, religious, leisure, and organizational areas of community life—would alter the character of these communities through at least the life of the project. The economic base of the communities would also be changed, with agriculture losing some of the dominance to industry.

Air Quality

An air quality modeling analysis was undertaken. The projected air quality impacts were compared to applicable state and federal ambient air quality standards as well as state Prevention of Significant Deterioration (PSD) regulations.

This facility was shown to comply with all state and federal ambient air quality standards. It was also found to be in compliance with all state PSD increments.



NORTH WIBAUX—BEACH TRACT

NORTH WIBAUX-BEACH
SITE-SPECIFIC SUMMARY MATRIX

COAL ECONOMICS

TRACT RANKING SUBFACTORS	PRESENT SITUATION	COMMENTS	INFORMATION SOURCE
Coal Quality	Lignite: Averages 5,966 Btus/lb. Sulfur: 1.1% Average.		USGS
Coal Quantity	Total Recoverable - 595.9 million tons. State - 4.2 million tons. Federal - 135.4 million tons.		USGS
Coal conservation and Maintenance of Production	90% recovery rate. New Mine.		USGS
Energy Production	It would take about 38 Btus to produce one lb. of coal. Possible end-use would be a gasification plant.	Net energy analysis 1 Btu expended for 158 Btus produced.	BLM
Likelihood of Leasing and Development	Tenneco expressed interest in leasing coal within the tract.		

IMPACTS TO THE NATURAL ENVIRONMENT

TRACT RANKING SUBFACTORS	PRESENT SITUATION	ANTICIPATED EFFECT OF LEASING DEVELOPMENT	SIGNIFICANCE OF ANTICIPATED IMPACT
Air Quality	Good	Could violate state and federal ambient TSP standards. Totally consumes the allowable Class II PSD increment for particulates.	Significant
Minerals Other than Coal	High interest for oil and gas exploration and development in the region, moderate interest in this site.	Delay of oil and gas exploration and development during active mining.	Significant
Water	Unpotable shallow groundwater and lignite aquifer.	Decline in quality. Disruption of supply to livestock.	Insignificant
Wildlife	Some wetlands and native prairie.	Would be destroyed. Reclamation unsure. Adverse impacts from human population increase.	Significant on and around tract. Unknown on a regional basis.
Cultural Features	Inventory incomplete. Inventory under contract.	Potential loss of significant undiscovered sites. Loss of scientific knowledge.	Significant
Amenity Values	Agricultural character. High aesthetic quality, low scenic value. Visible from Interstate 94.	The appearance of coal mining would be accepted as part of the character of the region.	Insignificant
Special Management Areas/ Unique Resource Impacts	No wilderness, special management, or ACEC's in the area.	Elimination of options for designation in the future	Insignificant

TRACT RANKING SUBFACTORS	PRESENT SITUATION	ANTICIPATED EFFECT OF LEASING/DEVELOPMENT	SIGNIFICANCE OF ANTICIPATED IMPACT
Other Land Use & Transportation	Agricultural area with local roads and utilities, 230 kv transmission line, gas pipeline.	Displacement of existing use, primarily agricultural, by mining and expansion of nearby towns. Relocation or bypass of transportation and utilities.	Significant
Reclamation Potential	Approximately 6% of the tract has poor reconstruction potential	Potentially unsuccessful reclamation of parts of the tract. Higher reclamation costs.	Insignificant
Unsuitability Criteria	Buffer zones deferred to mine plan. Cultural, federal and state listed endangered species, eagle nests, roost and concentration areas, falcon nesting sites, migratory birds, state resident fish and wildlife, and floodplains need further study.	Not applicable	Not applicable
	SOCIAL AND ECONOMIC		
Economic Changes	Population and employment levels forecasted relatively stable through 2000 A.D. Regional income to increase moderately.	Savage, Wibaux, Lambert, Sentinel Butte, Beach and Golva would experience population changes. Regional income would increase slightly.	Significant
Community Service Assessment	Savage, Wibaux, Beach, Golva, and Sentinel Butte have two or more inadequate services. Resident perception of problem areas include medical care, elderly care, school, retail and law enforcement.	One or more services would become inadequate in Sentinel Butte, Golva, Beach, and Wibaux.	Significant
Public Attitudes	Generally support (conditionally) coal development.	Not Applicable	Not Applicable
Lifestyle and Social Structure	Most residents favor the social atmosphere.	Some deterioration of quality of life in Wibaux and Golden Valley Counties.	Significant
Agricultural Operations	There are 36 operators in the tract. There are 8,942 acres of cropped land and 518 AUMs.	Operators affected by long-term loss of production. Average annual loss of 341 acres (10,025 bu. of wheat) excluding 5,078 acres of summer fallow. Maximum loss/peak mining year= 3,414 to 5,189 acres (100,372 to 152,557 bu. of wheat).	Significant
Consistency with other Plans and Policies	BLM - Management Framework Plan of 1980.		

SOUTH WIBAUX-BEACH

The South Wibaux-Beach tract is in Golden Valley County, North Dakota and Wibaux County, Montana, about three miles southwest of Beach, North Dakota. The land is primarily used for farming and ranching.

The tract contains 13 percent (202 million tons) of the federal coal under current consideration in the Fort Union Region. One economically recoverable seam of lignite coal, which averages 27.6 feet in thickness underlies the tract. Overburden ranges from less than 150 to 200 feet in thickness.

The generic mining plan calls for a surface mine using draglines, electric shovels, bottom-dump coal haulers, scrapers, and other support equipment. An on-site gasification plant would probably utilize the mined coal.

The tract includes three inactive mines. The nearest active mine is Knife River's Savage Mine which is 40 miles northwest of the tract. The tract lies just east of the inactive Wibaux Oil and Gas field and is in the Williston Basin where petroleum exploration, discovery, and production are increasing. The tract contains no producing oil or gas wells.

The land is used primarily for farming and ranching.

SITE SPECIFIC ANALYSIS

Air Quality

An air quality modeling analysis was undertaken. The projected air quality impacts resulting from the mine operation were compared to applicable state and federal ambient air quality standards as well as state Prevention of Significant Deterioration (PSD) regulations.

A mine on the South Wibaux-Beach tract was shown to comply with the state ambient air quality standards and the Class II PSD annual standards; however, the 24-hour particulate standards (which cannot be exceeded more than once per year) could possibly be violated during times of strong winds and peak production.

Minerals

Because the tract is in the Williston Basin, it has a potential for oil and gas development. Coal mining and associated operations preclude or inhibit certain phases of oil and gas exploration and development. Coal mining could delay exploration activities for six to eight years or even for the entire productive life of the mine.

Interest in this tract for oil and gas exploration and development is high.

Wildlife

Mining would eliminate the unfarmed wildlife habitat on the tract. Aquatic habitat, such as the wetlands found along the Montana-North Dakota border, also would be lost.

Cultural

Information on cultural resource values in the area is scarce. The tract could contain significant archaeological or historical sites and/or artifacts. Loss of these resources (due to mining) can be considered significant, unless more information is collected to indicate otherwise. Inventory being contracted now would raise the level of confidence that loss would or would not occur. The loss of identified values, if any exist, would be long-term and irreversible.

Land Use

Mining and town expansion would displace the dominant agricultural use of the area. Roads and utilities would be relocated or bypassed and would inconvenience those who depend on them.

Reclamation

Some instability problems such as area-wide settling or localized subsidence could occur. The extent of these problems would depend on reclamation planning and success. Over the long run, the original agricultural productivity level of soils should return to the tract.

Economic and Social

Construction and operation of the South Wibaux-Beach mine would result in significant impacts to services in some communities in the area. Wibaux, Lambert, and Savage, Montana and Beach, Golva, and Sentinel Butte, North Dakota would have significant increases in both population and employment due to development of the tract.

Population of several other communities in western North Dakota and eastern Montana would also increase as a result of tract development; however, assessments by the BLM and by city-county and regional planners show that these increases would be so small (often less than one percent of the baseline population), that they would not significantly affect community service adequacy.

Peak employment during the construction phase of the South Wibaux-Beach mine is expected to occur in 1987 at 260 employees, with full operations employment expected in 1993 at 440 employees. By 1987, Wibaux, Lambert, and Savage, Montana and Beach, North Dakota would experience an inadequate level of community services as a direct result of the peak construction employment/population levels. Some community services in Golva and Sentinel Butte, North Dakota would become inadequate by 1987 even without tract development. Tract-related population influx would further worsen these inadequate service situations.

Full operation of the South Wibaux-Beach mine (1993) is also expected to result in serious impacts to area communities. Wibaux, Beach, Golva, and Sentinel Butte would all have one or more service inadequacies as a direct result of the population influx associated with mining operation. Some community services in Lambert and Savage, Montana would become inadequate by 1993 without tract development. Tract-related population growth would result in additional strains on these services.

The rural areas of Wibaux, Golden Valley, and Billings counties would also receive tract-related population influx (though at a much lower level than the communities). This population growth would result in additional demands on some of the services.

The social effects of developing the mine would be centered in Wibaux and Golden Valley counties, particularly the communities of Wibaux and Beach. Both counties have limited economic diversity and have had population declines over the past several decades. Neither petroleum nor coal development has resulted in significant recent population increases. Community experience with the types of developments being proposed is limited.

For these reasons, temporary disruptions in the political, religious, educational, and family structures of these communities would be likely. However, these changes would not likely be pervasive among existing residents, and stability would be reestablished after the initial burst of growth. Coal development presents an opportunity for these communities to diversify and stabilize their economic circumstances over the long run. Given the present size and composition of existing populations, the transition period of moderately rapid change would be somewhat more difficult for residents in these areas than for persons living in larger, more complex communities. In Wibaux and Golden Valley counties, economic growth and stability would, at least initially, result in some social instability. This instability should be neither persistent nor long-lived. Population growth over the short run would likely lead to a decline in the residents' endorsement of the social atmospheres of Wibaux and Golden Valley counties. Informality, lack of stress, and lack of crowding would be less evident. These changes would not be particularly significant but would be noticeable.

Those area characteristics described in negative terms by residents, in a BLM random sample survey, particularly crime and shortages of medical care, would probably be more evident, further reducing satisfaction with the area.

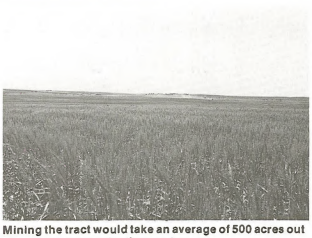
Agriculture

Mining the tract would require taking an average of 500 acres out of agricultural prouction each year. By the end of the mine life, 15,094 acres of the tract would have been disturbed.

An average of 241 acres of cropland, excluding summer fallow, would be removed from production each year, resulting in an average annual loss of 7,085 bushels of wheat. This cropland would be out of production ten to fifteen years, with a maximum of 2,438 to 3,657 acres out of production in any one peak mining year. In total, the maximum annual loss would range from 71,677 to 107,516 bushels of wheat.

An average of 18 acres of rangeland would also be removed from production each year, resulting in an average loss of 9 AUMs (animal unit months). This rangeland would be out of production ten to fifteen years, with a maximum of 171 to 257 acres out of production in any one peak mining year. In total, the maximum annual loss would range from 86 to 129 AUMs.

These losses would not significantly reduce regional agricultural production; however, individual operators could be severely impacted.



Mining the tract would take an average of 500 acres out of agricultural production each year.

FACILITY ANALYSIS

The coal mined from the tract would probably be used in a gasification plant located near the mine.

Agriculture

Approximately 960 acres for the facility site would be taken out of agricultural production. In a worst-case analysis, 13,900 bushels of wheat would be lost annually for the life of the gasification plant (based on current land use).

A short-term disruption of 12 acres per mile would result during construction of an undetermined length of water pipeline. Roadways would disturb 14.5 acres per mile. A railroad spur would eliminate agriculture on 18 acres per mile for the entire life of the gasification plant.

Potential negative impacts to vegetation and to livestock exist downwind from a gasification plant due to nitrogen oxides, sulfur dioxide, and particulate matter (West-Central North Dakota Regional Environmental Impact Study on Energy Development, 1978). These negative impacts would be analyzed in detail by the state permitting authorities during their review of facility permit applications.

Water

Water requirements for the South Wibaux-Beach gasification plant are predicted to be approximately 10,000 acre-feet per year. The likely source of water would the Yellowstone River. Present regulations require state approval of disposal sites for facility wastes of ash, sludge, and water.

Recreation

Recreation facilities in the region (community camping and picnic areas, Fort Peck Reservoir, and Charles M. Russell National Wildlife Refuge) are expected to receive the bulk of recreation demand from the projected increased population.

Wildlife

Wildlife impacts associated with the gasification plant could occur in two ways: 1) impacts from destruction of habitat and 2) impacts from the increase in human population. Removal of vegetation for a 960-acre gasification facility and the expansion of urban areas, highways, and railroads would prevent or reduce the use of an area by wildlife regardless of the type of vegetation removed.

Powerlines, pipelines, and access roads could be constructed in key wildlife areas with partial or total destruction of habitat. Other anticipated impacts include eagle electrocutions on powerlines, migratory bird deaths from striking powerlines close to wetlands, road kills along transportation routes through wildlife areas, harassment of wildlife by off-road vehicle use, and increased poaching. These impacts, along with habitat destruction, would result in decreased wildlife populations in the area. Wildlife oriented recreation such as hunting and observation would have to be sought elsewhere.

Poaching and road kills have increased dramatically in areas of North Dakota, Montana, Wyoming, and Colorado where energy development has occurred. The problem is compounded where transportation corridors are in important wildlife areas and when employee shift changes coincide with wildlife feeding periods. This situation could occur in the tract area.

Aesthetics

The visual impact would be the penetration of the skyline by the facility as seen from communities and major transportation corridors. The 500-foot stack could potentially be seen 30 or more miles away and would evoke a response either positive or negative. The dominance of the facility in the landscape could be perceived as a loss of amenity through impairment of the landscape during the 40 years of the expected life of the plant.

Economic and Social

Construction and operation of the gasification plant would result in impacts upon services in some communities due to population growth. Richey, West Glendive, Glendive, Lindsay, Sidney, Lambert, Savage, Fairview, and Wibaux, Montana and Golva, Sentinel Butte, and Beach, North Dakota would experience significant increases in population and employment as the result of the development of the facility.

Peak employment during the construction phase is expected to occur in 1987 at 3,200 employees, with full operations employment expected in 1991 at 1,050 employees. By 1987, the above communities would experience an inadequate level of one or more community services as a direct result of the peak construction employment/population levels.

Population growth associated with full operation of the South Wibaux-Beach facility (1991 and beyond) is expected to cause service inadequacies in Glendive, Lambert, Savage, Fairview, and Wibaux, Montana and Golva, Sentinel Butte, and Beach, North Dakota. Even without tract development several community services would be inadequate in Lindsay, Sidney, West Glendive, and Richey, Montana by 1991. Development of the South Wibaux-Beach facility would add to the expected problems.

Patterns of residents' attitudes toward coal conversion

facilities are highly variable across the four-county (Wibaux, Richland, Dawson, and Golden Valley) area. Based on interviews with eighty-four residents in a BLM random sample survey of the four-county area, support apparently is strongest in Richland County, where roughly three-fourths of the persons contacted favor such a plant or plants. At the opposite extreme, more than one-half of the Golden Valley County residents contacted expressed firm opposition to such a facility. Levels of support and opposition in Wibaux and Dawson counties fell between these two extremes. Only a very small number of Wibaux and Golden Valley County residents were contacted. Possible effects of a facility on air quality and the local social consequences of rapid population growth were dominant concerns throughout the four-county area.

Construction of the Wibaux-Beach facility would result in a variable distribution of benefits and costs among present and future residents. Persons with energy job skills, persons who could acquire these skills, persons outside the labor force who want jobs and some local merchants clearly would benefit economically. Others would be adversely effected. They would experience a rapidly changed social environment without directly enjoying any of the economic benefits.

Throughout the four-county area, the small-town, relaxed, friendly social environment is the dimension of community life most appreciated by many residents. Construction of the South Wibaux-Beach plant would be associated with a radically different community atmosphere for the short term. Many persons likely would be less satisfied with their home communities than they would be should development not occur.

Glendive, Sidney, Wibaux, and Beach would receive most of the population growth caused by construction and operation of the South Wibaux-Beach facility. The relative number of new residents (above that expected without development) is quite high, particularly in Wibaux and Beach. The present and forecasted baseline populations in these two communities are quite low. The capacity for Wibaux and Golden Valley counties to absorb significant growth during the construction phase is uncertain. Both areas are agricultural, with small population bases, and have had little or no community experience with industrialization. Glendive and Sidney, by contrast, are somewhat better prepared to deal with such changes.

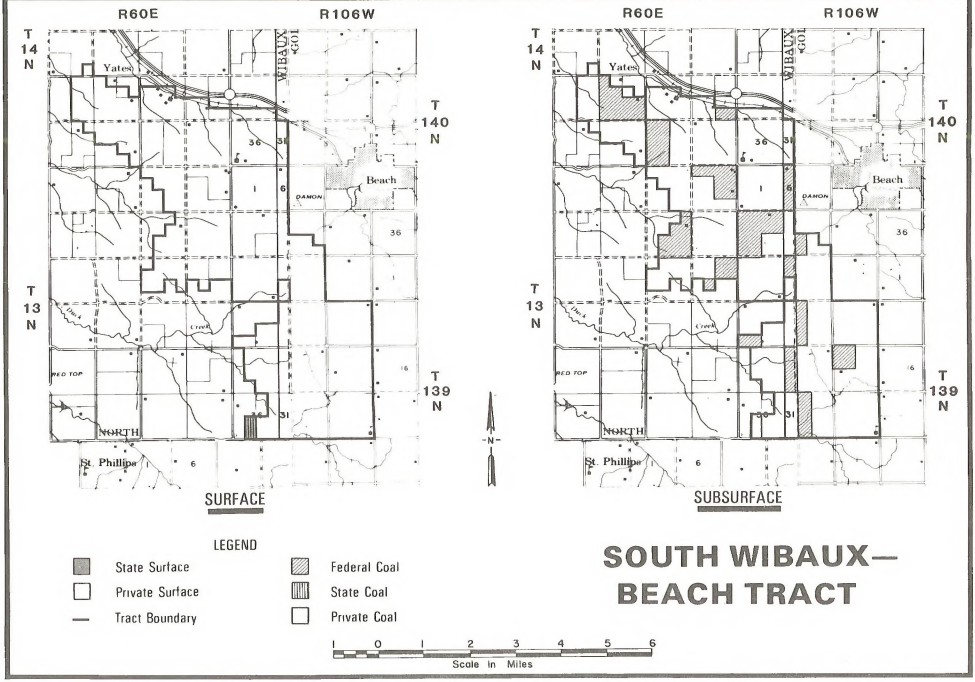
Beach, Golva, Sentinel Butte, and Wibaux would go through significant social changes due to the facility. During the construction phase Wibaux and Beach would be communities with substantial disorganization, stress, and poor match-ups between resident needs and public services and facilities. Major deficits should be expected in such areas as law enforcement, education, social services, and health care.

Long-term permanent residents would likely be buffered to some extent by established social networks, but the magnitude of the changes in Beach and Wibaux would be of such scale that avoidance of social problems due to rapid growth would be most difficult. After the arrival of the operational work force, stability would probably be reestablished in the four-county area, and only the communities of Wibaux, Beach, and Golva would likely display evidence of long-term, significant social changes. The long term changes—in the political, family, religious, leisure, and organizational areas of community life—would alter the character of these communities through at least the life of the project. The economic base of the communities would also be changed, with agriculture losing some of its dominance to industry.

Air Quality

An Air Quality Modeling Analysis was undertaken. The projected air quality impacts resulting from the plant operation were compared to applicable state and federal Ambient Air Quality Standards as well as state Prevention of Significant Deterioration (PSD) regulations.

This facility was shown to comply with all state and federal ambient air quality standards. It was also found to be in compliance with all state PSD increments.



SOUTH WIBAUX—BEACH TRACT

SOUTH WIBAUX-BEACH
SITE-SPECIFIC SUMMARY MATRIX

COAL ECONOMICS

TRACT RANKING SUBFACTORS	PRESENT SITUATION	COMMENTS	INFORMATION SOURCE
Coal Quality	Lignite: Averages 5,966 Btus/lb. Sulfur: 1.1% Average.		USGS
Coal Quantity	Total Recoverable - 662.1 million tons. State - 4.7 milion tons. Federal - 150.4 million tons.		USGS
Coal conservation and Maintenance of Production	90% recovery rate. New Mine.		USGS
Energy Production	Nat energy analysis. About 38 Btus to produce one lb. of coal.	Nat energy analysis 1 Btu expended for 162 Btus produced.	BLM/USGS
Likelihood of Leasing and Development	Tenneco coal provided a specific expression of leasing interest in coal within the tract.	Possible end-use would be coal gasification plant.	BLM

IMPACTS TO THE NATURAL ENVIRONMENT

TRACT RANKING SUBFACTORS	PRESENT SITUATION	ANTICIPATED EFFECT OF LEASING DEVELOPMENT	SIGNIFICANCE OF ANTICIPATED IMPACT
Air Quality	Good	Could violate state and federal ambient TSP standard. Totally consumes the allowable Class II PSD increment for particulates.	Significant
Minerals Other than Coal	High interest in oil and gas exploration and development in the region. Moderate interest in the tract.	Delay of oil and gas exploration and development. Moderate probability of conflict.	Significant
Water	Unpotable.	Decline in quality. Disruption of supply to livestock.	Insignificant
Wildlife	Marginal habitat.	Could be reclaimed.	Insignificant
Cultural Features	Inventory incomplete. Inventory under contract.	Potential loss of significant undiscovered sites. Loss of scientific knowledge.	Significant
Amenity Values	Agricultural lands of high aesthetic quality, low scenic value. Visible from Interstate 94.	The appearance of coal mining would be accepted as part of the character of the area.	Insignificant
Special Management Areas/ Unique Resource Impacts	No wilderness, special management, or ACEC's in the area.	Elimination of options for designation in the future	Insignificant

TRACT RANKING SUBFACTORS	PRESENT SITUATION	ANTICIPATED EFFECT OF LEASING/DEVELOPMENT	SIGNIFICANCE OF ANTICIPATED IMPACT
Other Land Use & Transportation	Agricultural use. Local roads and utilities. 230 kv transmission line and gas pipeline.	Displacement of existing use, primarily agricultural, by mining and expansion of nearby towns. Relocation or bypass of transportation and utilities.	Significant
Reclamation Potential	Approximately 6% of the tract has poor reclamation potential.	Potentially unsuccessful reclamation of parts of the tract. Higher reclamation costs.	Insignificant
Unsuitability Criteria	Buffer zones deferred to mine plan. Cultural, federal and state listed endangered species, eagle nests, roost and concentration areas, falcon nesting sites, migratory birds, state resident fish and wildlife, and floodplains need further study.	Not applicable	Not applicable
	SOCIAL AND ECONOMIC		
Economic Changes	Population and employment levels forecasted relatively stable through 2000 A.D. Regional income to increase moderately.	Savage, Wibaux, Lambert, Sentinel Butte, Beach and Golva would experience population changes. Regional income would increase slightly.	Significant
Community Service Assessment	Savage, Wibaux, Beach, Golva, and Sentinel Butte have two or more inadequate services. Resident perception of problem areas include medical care, elderly care, schools, retail and law enforcement.	One or more services would become inadequate in Sentinel Butte, Golva, Beach, and Wibaux.	Significant
Public Attitudes	Generally support (conditionally) coal development.	Not Applicable	Not Applicable
Lifestyle and Social Structure	Most residents favor the informal atmosphere.	Some deterioration of quality of life in Wibaux and Golden Valley Counties.	Not Applicable
Agricultural Operations	There are 36 operators in the tract. There are 7,907 acres of cropped land and 357 AUMs.	Operators affected by long-term loss of production. Average annual loss of 241 acres (7,085 bu. of wheat) excluding 4,223 acres of summer fallow. Maximum loss/peak mining year= 2,438 to 3,657 acres (75,677 to 107,516 bu. of wheat).	Significant
Consistency with other Plans and Policies	BLM - Management Framework Plan of 1980.	Not Applicable	Not Applicable

ZENITH

The Zenith tract is located in Stark County, North Dakota between the towns of Belfield and South Heart.

The land in that area is primarily used for farming and ranching.

The tract contains 8 percent (131.8 million tons) of the federal coal under current consideration in the Fort Union Region. Two economically recoverable seams of lignite coal underlie the tract. They are 5.8 and 15.8 feet thick on the average, with overburden ranging from less than 150 feet to 200 feet thick.

The generic mining plan calls for a surface mine using draglines, electric shovels, bottom-dump coal haulers, scrapers, and other support equipment. An on-site gasification plant would utilize the mined coal.

The tract is in the Williston Basin where oil and gas exploration, discovery, and production is increasing.

The tract is in the Williston Basin where oil and gas exploration is increasing.

SITE SPECIFIC ANALYSIS

Air Quality

An air quality modeling analysis was undertaken. The projected air quality impacts resulting from the mine operation were compared to applicable state and federal ambient air quality standards as well as state Prevention of Significant Deterioration (PSD) regulations.

A mine on the Zenith tract was shown to comply with the state ambient air quality standards and the Class II PSD annual standards; however, the 24-hour particulate standards (which cannot be exceeded more than once per year) could possibly be violated during times of strong winds and peak production.

Minerals

This tract overlaps the Zenith oil field. Through May 1980, 13 wells had been completed in the field with 8 currently producing. Coal mining and associated operations preclude or inhibit certain phases of oil and gas exploration and development. Coal mining could delay exploration activities for six to eight years or even for the entire production life of the mine.

Water

Contamination of groundwater would increase already unacceptable levels of sulfate, sodium and total dissolved solids. Increases of these constituents would ultimately affect the municipal water supply of Dickinson. The impact is considered severe but much depends upon the reclamation techniques used and upon the mine plan.

Wildlife

Mining would eliminate the unique unfarmed wildlife habitats on the tract such as native woodlands, riparian and other wetlands, and native prairie habitats. The most essential habitat loss would be the riparian woodlands along the Heart River and Norwegian Creek.

Cultural

Information on cultural resource values in the area is scarce. The tract could contain significant archaeological or historical sites and/or artifacts. Loss of these resources (due to mining) can be considered significant, unless more information is collected to indicate otherwise. Inventory being contracted now would raise the level of confidence that loss would or would not occur. The loss of identified values, if any exist, would be long-term and irreversible.

Reclamation

Some instability problems such as area-wide settling or localized subsidence could occur. The extent of the problems would depend on reclamation planning and success. Over the long run, the original agricultural productivity level should return to the soil.

Economic and Social

Construction and operation of the mine would result in significant impacts upon services in some communities within the area as a result of population growth associated with employment opportunities. Belfield, Dickinson, South Heart, Beach, and Mandan would experience a significant increase in both population and employment.

Several other communities in western North Dakota

would also receive population increases as a result of tract development. However, assessments by the Bureau as well as city-county and regional planners show that these population increases are so small (often less than one percent of the baseline population) that they would not significantly affect community service adequacy.

Peak employment during the construction phase of the mine is expected to occur in 1988 at 260 employees, with full operations employment expected in 1994 at 425 employees. By 1988, the communities of Belfield, Dickinson, South Heart, and Mandan would find one or more community services to be inadequate as a direct result of the population levels associated with construction of the mine. Some services, such as elementary schools in South Heart, would be inadequate by 1988 even without tract development. Tract-related population growth would further worsen an inadequate service situation.

Full operation (1994 and beyond) of the Zenith mine is also expected to result in serious impacts to some area communities. Belfield, Dickinson, South Heart, and Mandan would experience an inadequate level of services as a direct result of the population influx associated with tract operation. Beach would not experience any significant impacts to community services as a result of tract operation.

The rural areas of Stark County would also receive tract-related population influx (though at a much lower level than the communities). This population growth, along with that of the adjacent Billings County, would result in additional demands on some of the services.

Opening and operating the mine would result in some population changes in Dunn Center, but the population and resultant social effects would be primarily located in Medora, Beach, Dickinson, Belfield, and South Heart. The relative magnitude, during both the construction and operation phases, of population effects are very similar across the Billings, Golden Valley, and Stark county area.

Dickinson would be much better prepared to deal with this growth than would Medora, Beach, South Heart, or Belfield. Dickinson is, relative to the other communities, large, diverse, and experienced with oil and gas related development. Medora and Beach are quite small, more socially and economically homogeneous, and have not experienced significant population growth attached to either coal or oil and gas development.

Belfield and South Heart are also relatively small communities but have experienced significant population growth due to oil and gas development. Thus, the effects of the mine would be uneven in terms of social structural effects. In Dickinson, noticeable changes could be attributed to the mine independent of other ongoing community changes. The political, religious, and organizational life of the communities would be affected by these changes, in terms of community lifestyle, would likely not be significant. In Medora, Beach, South Heart, and Belfield, because of their present and anticipated future characteristics without development, the incoming populations probably would have more fundamental effects on community life.

Residents in both Golden Valley and Stark county in a BLM random sample survey have expressed the belief that the social atmosphere is the area's best characteristic. Residents of Billings County probably would echo this sentiment. It would be expected that the effects of the mine would somewhat negatively intrude on the way these people think about their communities. The communities would likely become somewhat more segmented, impersonal, and crowded.

Those area characteristics most frequently mentioned as unfavorable would become somewhat more unfavorable to many existing and future residents. For example, traffic and road maintenance problems would probably become more pronounced. It is uncertain as to whether or not the attendant population growth would result in the creation of more outdoor recreation and medical care opportunities than would exist without such growth.

For these reasons, it appears that the mine would have a slighly negative effect on the quality of life in the affected areas. This effect, for many residents, would be attached directly to the population growth generated by the mine.

Agriculture

The proposed action would progressively remove an average of 563 acres of the total tract per year from agricultural use.

An average of 212 acres of cropland, excluding summer fallow, would be removed from production each year. This would be an average annual loss of 5,364 bushels of wheat. The cropland would be out of production ten years, with a maximum of 2,120 acres out of production in any one peak mining year, resulting in a maximum loss of 53,640 bushels of wheat annually.

Peak mining year disturbance of 573 acres of hayland would result in an annual loss of 716 tons of hay production.

An average of 169 acres of rangeland would also be removed from production each year, resulting in an average loss of 84 AUMs (animal unit months). This rangeland would be out of production ten years, with a maximum of 1,686 acres out of production in any one peak mining year, resulting in a maximum annual loss of 843 AUMs.

Regionally, these losses would not pose significant

reduction in area agricultural production, but individual operators could be severely impacted.

The land is used primarily for farming and ranching.

FACILITY ANALYSIS

The coal mined from the tract would probably be used in a gasification plant located near the mine.

Agriculture

Approximately 960 acres for the facility site would be taken out of agricultural production. In a worst-case analysis, annual agricultural production lost for the life of the facility would be 12,500 bushels of wheat (based on current land use).

A short-term disruption of 12 acres per mile would result during construction of an undetermined length of water pipeline. Roadways would disturb 14.5 acres per mile. A railroad spur would eliminate agriculture on 18 acres per mile for the entire life of the gasification plant.

Potential negative impacts to vegetation and to livestock exist downwind from such a facility due to nitrogen oxides, sulfur dioxide, and particulate matter (West-Central North Dakota Regional Environmental Impact Study on Energy Development, 1978). These negative impacts would be analyzed in detail by the state permitting authorities during their review of facility permit applications.

Water

Water requirements for a gasification plant are approximately 12,000 acre-feet per year. The likely source of water would be Lake Sakakawea. Present regulations require state approval of disposal sites for facility wastes of ash, sludge, and water.

Recreation

Recreation facilities in the region (community camping and picnic areas, Lake Sakakawea, and Theodore Roosevelt National Memorial Park) are expected to receive the bulk of recreation demand from the projected increased population. The social attitude survey revealed a concern for existing recreation facilities. It was also stated that an increase in population might result in the possible upgrading of currently marginal recreation facilities.

Wildlife

Wildlife impacts associated with the gasification plant could occur in two ways: 1) impacts from destruction of habitat and 2) impacts from the increase in human population. The removal of vegetation for a 960-acre gasification facility and the expansion of urban areas, highways, and railroads would prevent or reduce the use of an area by wildlife regardless of the type of vegetation removed.

Powerlines, pipelines, and access roads could be constructed in key wildlife areas, with partial or total destruction of habitat. Other anticipated impacts include eagle electrocutions on powerlines, migratory bird deaths from striking powerlines close to wetlands, road kills along transportation routes through wildlife areas, harassment of wildlife by off-road vehicle use, and increased poaching. These impacts, along with habitat destruction, would result in decreased wildlife populations in the area. Wildlife oriented recreation such as hunting and observation would have to be sought elsewhere.

Poaching and road kills have increased dramatically in areas of North Dakota, Montana, Wyoming, and Colorado where energy development has occurred. The problem is compounded in areas where transportation corridors pass through wildlife areas and when employee shift changes coincide with wildlife feeding periods. This situation could occur in the tract area.

Aesthetics

The visual impact would be the penetration of the skyline by the facility as seen from communities and major transportation corridors. The 500-foot stack could potentially be seen thirty or more miles away and would evoke a response either positive or negative. The dominance of the facility in the landscape could be perceived as a loss of amenity through impairment of the landscape during the 40 years of the expected life of the plant.

Economic and Social

Construction and operation of the facility would result in impacts upon services in some communities within the area as a result of population growth associated with employment opportunities. Dickinson, Belfield, and South Heart would experience increases in both

population and employment as a result of development of the facility.

Peak employment during the construction phase of the facility is expected to occur in 1992 at 3,057 employees, with full operations employment expected in 1999 at 900 employees. By 1992, the above communities would probably have an inadequate level of one or more community services as a direct result of the peak construction employment/population levels.

Population growth directly associated with full operation of the Zenith facility (1999 and beyond) is also expected to create public service problems in Dickinson, Belfield, and South Heart.

Forty-two residents in Dunn, Stark, and Golden Valley counties were contacted by BLM representatives in a random sample survey and asked how they felt about the construction and operation of a coal conversion facility or facilities in the area. Support for such facilities was high in Dunn and Stark counties, where about three out of four persons contacted expressed support and roughly one-fourth of the persons interviewed were opposed. However, in Golden Valley County, more persons opposed the construction of such a facility than supported it. Only a small number (7) of Golden Valley residents were interviewed and thus it is best to use a great deal of caution in interpreting these results. However, it does appear that persons in the general population are much less supportive of development than persons in Dunn and Stark County.

Some persons in the three-county area would benefit economically, both for the short-term and the long-term, by construction of a plant. These persons include local retailers, some persons outside the labor force desiring entry, and persons with or capable of acquiring industrial skills. Likewise, some persons would not participate in the financial benefits of such a facility but would face a significantly changed community of residence. These persons would have to live in a more difficult social environment than they would without development. Stressful, unpredictable, and rapidly changing local social conditions would be apparent, at least during the construction phase.

The most widely endorsed aspect of life in western North Dakota, according to the BLM interviews, is the quiet, peaceful, small-town social environment. During the short-term, this environment would be disrupted in Dunn, Golden Valley, and Stark counties. The disruption would be most noticeable in Belfield, Dickinson, Beach, and Killdeer. Residents in these areas would clearly not live in the same social atmosphere that would exist without development.

Population changes attached to the Zenith plant would fall primarily on Dickinson and, to a lesser extent, on Belfield. Because of recent oil and gas development in the area, Stark County is in a fairly solid position of dealing with rapid population growth. Economic and social diversity, a sizeable population base, and experience with industrialization already exist in Stark County. Even these assets would be pressed as large numbers of newcomers enter the communities of Dickinson, Belfield, and South Heart during the construction phase of the Zenith plant.

In Dunn and Golden Valley counties, the level of experience with industrialization is lower, the economic base is less diverse, the population size is considerably lower, and historically there have been, over the last several decades, population decreases. Dunn Center, Killdeer, Manning, Beach, and Golva would face community growth problems during the construction phase of the plant.

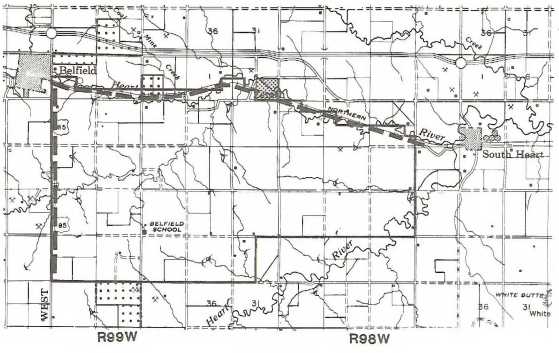
These problems in adapting to rapid population growth would be short lived. The long-term implications of the plant in Dunn, Stark, and Golden Valley counties are quite limited. Most of the social stress attached to the plant would occur during the construction phase with a more routine social environment being established after construction. Community capacity would be exceeded during the short-term but not during the long-term. Long-term institutional (political, leisure, family, and religious) change is not likely to occur if the plant is built.

Air Quality

An air quality modeling analysis was undertaken. The projected air quality impacts resulting from the facilities emissions were compared to applicable state and federal ambient air quality standards as well as state Prevention of Significant Deterioration (PSD) regulations.

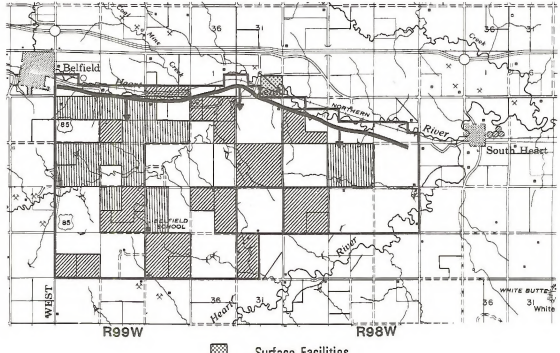
This facility was shown to comply with the state ambient air quality standards and the Class II increments. The facility was projected to violate the state Class I 3-hour and 24-hour SO_2 increment over the Theodore Roosevelt National Memorial Park, South Unit.

ZENITH TRACT



LEGEND

- Private Surface
- Surface Owner Nonconsents
- Tract Boundary
- Federal Coal
- State Coal
- Private Coal



- Surface Facilities
- Out-of-Pit Haul Roads
- Pit Advancement

Scale In Miles

ZENITH
SITE-SPECIFIC SUMMARY MATRIX

COAL ECONOMICS

TRACT RANKING SUBFACTORS	PRESENT SITUATION	COMMENTS	INFORMATION SOURCE
Coal Quality	Lignite: Averages 5,843 Btus/lb. Sulfur: 1.1% Average.		USGS
Coal Quantity	Total Recoverable - 486.6 million tons. State - 131.8 milion tons. Federal - 35.9 million tons.		USGS
Coal conservation and Maintenance of Production	90% recovery rate. New Mine.		USGS
Energy Production	Net energy analysis. About 38 Btus to produce one lb. of coal.	Net energy analysis 1 Btu expended for 155 Btus produced.	BLM
Likelihood of Leasing and Development	Three expressions of leasing interest were received.		BLM

IMPACTS TO THE NATURAL ENVIRONMENT

TRACT RANKING SUBFACTORS	PRESENT SITUATION	ANTICIPATED EFFECT OF LEASING DEVELOPMENT	SIGNIFICANCE OF ANTICIPATED IMPACT
Air Quality	Good	Could violate state and federal ambient TSP standard. Totally consumes the allowable Class II PSD increment for particulates.	Significant
Minerals Other than Coal	Oil and gas field occupies part of the tract. Active exploration.	Conflict between oil and gas activity and coal activity. Delay of further exploration.	Significant
Water	Water is nonpotable, area empties via small aquifers to the Heart River.	Contamination of groundwater and subsequent contamination of the Heart River.	Significant
Wildlife	Woodlands, riparian, potholes and fishing habitat occurs.	Would destroy habitat and reduce wildlife numbers. Increase in human population would have adverse impacts. Reclamation unsure.	Significant on and around tract. Unknown on a regional basis.
Cultural Features	Inventory incomplete. Inventory under contract.	Potential loss of or disruption of undiscovered sites. Loss of scientific knowledge.	Significant
Amenity Values	Aesthetically attractive but low scenic values. Agricultural and modified landscapes.	Mining would be considered an acceptable use of the land and in keeping with the regional character.	Insignificant
Special Management Areas/ Unique Resource Impacts	No wilderness, special management, or ACEC's in the area.	Elimination of options for designation in the future	Insignificant

TRACT RANKING SUBFACTORS	PRESENT SITUATION	ANTICIPATED EFFECT OF LEASING/DEVELOPMENT	SIGNIFICANCE OF ANTICIPATED IMPACT
Other Land Use & Transportation	Agriculture, oil development, coal mining, a sewage treatment plant, Highways 10 and 85, Belfield School.	Displacement of bypass of existing uses in the short term.	Insignificant
Reclamation Potential	44% of the area has been rated "poor" for reclamation.	Possible failure of site to revegetate. Difficulty reclaiming and more expense involved.	Insignificant
Unsuitability Criteria	Buffer zones deferred to mine plan. Cultural, federal and state listed endangered species, eagle nests, roost and concentration areas, falcon nesting sites, migratory birds, state resident fish and wildlife, and floodplains need further study.	Not applicable	Not applicable
	SOCIAL AND ECONMIC		
Economic Changes	Population and employment levels forecasted relatively stable through 2000 A.D. Regional income to increase moderately.	Belfield, Dickinson, South Heart, Beach and Mandan would experience population increases. Regional income would increase slightly.	Significant
Community Service Assessment	Belfield, South Heart, Dickinson, Beach, and Mandan have two or more inadequate services. Resident perception of problem areas include: medical care, elderly care, schools, retail, recreation, and law enforcement.	One or more services would become inadequate in Mandan, Dickinson, South Heart, and Belfield.	Significant
Public Attitudes	Generally support (conditionally) coal development.	Not Applicable	Not Applicable
Lifestyle and Social Structure	Most residents favor the informal, friendly atmosphere.	Some deterioration of quality of life in Stark and Golden Valley Counties.	Not Applicable
Agricultural Operations	There are 36 operators in the tract. There are 8,474 acres of cropped land and 3,372 AUMs.	Operators affected by long-term loss of production. Average annual loss of 212 acres (5,364 bu. of wheat) excluding 4,999 acres of summer fallow. Maximum loss/peak mining year= 2,120 acres (53,640 bu. of wheat).	Significant
Consistency with other Plans and Policies	BLM - Management Framework Plan of 1980.	Not Applicable	Not Applicable

SCHOOLHOUSE

The Schoolhouse tract is about two miles south of the town of Beulah in Mercer and Oliver counties, North Dakota. The land is primarily used for farming, ranching, and coal mining.

The tract contains 2 percent (38.7 million tons) of the federal coal under current consideration in the Fort Union Region. Two economically recoverable seams of lignite coal, which are 11 and 8 feet thick on the average, underlie the tract. Overburden averages 200 feet in thickness.

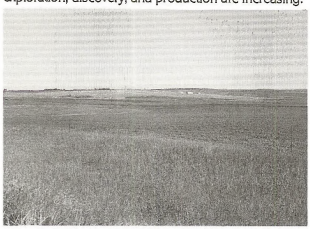
The generic mining plan calls for a surface mine using draglines, electric shovels, bottom-dump coal haulers, scrapers, and other support equipment. The coal would probably be utilized by the Coyote I electric power plant.

Oliver and Mercer counties are at the center of coal energy development in North Dakota. The existing Knife River Beulah Mine within the tract produces 2.2 million tons of coal annually for the recently constructed Coyote I Power Plant. North American Coal Corporation's Indianhead mine, about 6 miles northwest, supplies 1.2 million tons of coal annually to the Stanton Power Plant. North American's Falkirk mine, a little over 30 miles to the northeast, supplies 5.67 million tons of coal annually to the Coal Creek Power Plant. The Glenharold mine, 20 miles east, supplies 3.8 million tons of coal annually to the Leland Olds power plant. Baukol Noonan's Center mine, 20 miles southeast, produces 4.1 million tons annually for the Milton Young power plant.

The Nokota Company has proposed a mine and liquefaction plant near Dunn Center. Coteau Properties, Inc., will eventually supply approximately 14 million tons of lignite annually to the Antelope Valley Power Plant and the ANG Coal Gasification Plant 10 miles north.

If the coal were not to be leased, it probably would be bypassed and never mined.

The tract is in the Williston Basin, where petroleum exploration, discovery, and production are increasing.



Farming and ranching occur on the tract.

SITE SPECIFIC ANALYSIS

Minerals

Because the tract is in the Williston Basin, it has a potential for oil and gas development. Coal mining and associated operations preclude or inhibit certain phases of oil and gas exploration and development. Coal mining could delay exploration activities for six to eight years or even for the entire productive life of the mine.

Wildlife

Mining would eliminate the unique unfarmed wildlife habitat on the tract. Wetlands, native woodlands, and remnant interspersed native prairie would be destroyed.

Cultural

There is some recorded information on cultural resource values in the area. The tract could contain undiscovered significant archaeological or historical sites and/or artifacts. Loss of these resources (due to mining) can be considered significant, unless more information is collected to indicate otherwise. The loss of identified values, if any exist, would be long-term and irreversible.

Reclamation

Some instability problems such as area-wide settling or localized subsidence could occur. The extent of these problems would depend on reclamation planning and results. Over the long run, the original productivity level of soils should return to the tract.

Economic and Social

The Knife River Coal Mining Company plans to increase production from two million to five million tons annually in 1995. This expanded production would include about 120,000 tons per year of federal coal. On May 11, 1981, the Dickinson District Geologist talked with A.J. Wittmaier (President of Knife River Coal Company) about any increased employment that would accompany the new production. Mr. Wittmaier stated that new employment would be insignificant and primarily limited to loading crews and truck drivers.

Due to the small increase in employment, population increases in the surrounding communities would also be small, and would produce no significant impacts to community services or changes in social conditions.

The only effect of leasing on community services would

be to continue the existing level of demand for these services for an additional 48 years (life of the mine).

Agriculture

Mining the tract would require taking an average of 270 acres out of agricultural production each year.

An average of 86 acres of cropland, excluding summer fallow, would be removed from production each year, resulting in an average annual loss of 2,167 bushels of wheat. This cropland would be out of production ten years, with a maximum of 857 acres out of production in any one peak mining year. In total the maximum annual loss would be 21,596 bushels of wheat.

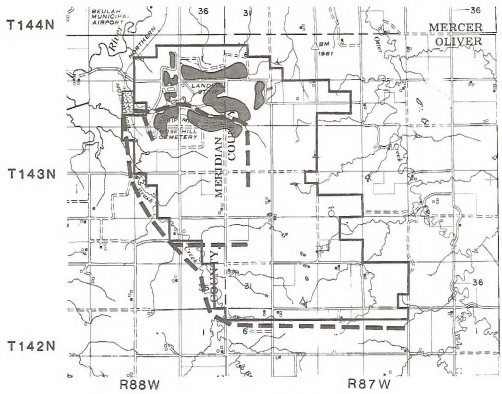
Peak mining year disturbance of 398 acres of hayland would result in an annual loss of 617 tons of hay production.

An average of 111 acres of rangeland would also be removed from production each year, resulting in an average loss of 56 AUMs (animal unit months). This rangeland would be out of production ten years, with a maximum of 1,101 acres out of production in any one peak mining year. The maximum annual loss would be 551 AUMs.

Regionally, these losses would not pose significant reductions in area agricultural production; however, individual operators could be severely impacted.

Mining would take an average of 270 acres out of agricultural production annually.

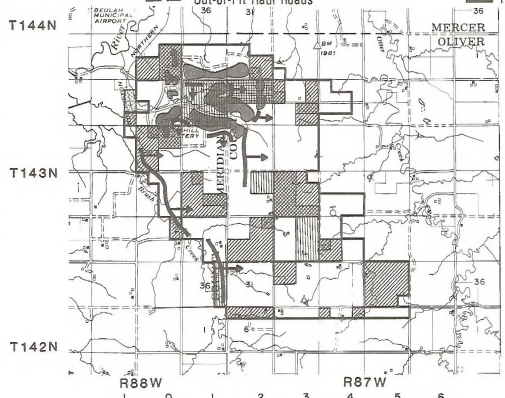
SCHOOLHOUSE TRACT



SURFACE

LEGEND

- Private Surface
- Tract Boundary
- Mined Out Areas
- Out-of-Pit Haul Roads
- Federal Coal
- State Coal (50%)
- Private Coal
- Leased Federal Coal
- Leased State Coal
- Surface Facilities
- Pit Advancement



SUBSURFACE

0 1 2 3 4 5 6

Scale in Miles

SCHOOLHOUSE
SITE-SPECIFIC SUMMARY MATRIX

COAL ECONOMICS

TRACT RANKING SUBFACTORS	PRESENT SITUATION	COMMENTS	INFORMATION SOURCE
Coal Quality	Lignite: Averages 6,919 Btus/lb. Sulfur: 0.8% Average.		USGS
Coal Quantity	Total Recoverable - 248 million tons. State - 19.0 million tons. Federal Leased 27.0 million tons. Federal Unleased - 37.7 million tons.		USGS
Coal conservation and Maintenance of Production	90% recovery rate. Production maintenance and new production.		USGS/BLM
Energy Production	Net energy analysis. About 37.7 Btus to produce one lb. of coal.	Net energy analysis 1 Btu expended for 183 Btus produced.	BLM
Likelihood of Leasing and Development	Good	The Beulah mine is operating within the tract.	BLM

IMPACTS TO THE NATURAL ENVIRONMENT

TRACT RANKING SUBFACTORS	PRESENT SITUATION	ANTICIPATED EFFECT OF LEASING DEVELOPMENT	SIGNIFICANCE OF ANTICIPATED IMPACT
Air Quality	Good	Totally consumes the allowable Class II PSD increment for particulates.	Significant
Minerals Other than Coal	Interest in oil and gas exploration and development is high in the region but low for the tract. Some exploration conducted.	Delay of exploration and development. Potential for conflict is very low.	Insignificant
Water	Unpotable water.	Degradation of groundwater.	Insignificant
Wildlife	Native prairie 22%, woodlands 2% and wetlands 2%.	Would destroy habitat. Increase in human population would have adverse impacts. Reclamation unsure.	Significant on and around tract. Unknown on a regional basis.
Cultural Features	No inventory on tract to date.	Potential loss of significant but undiscovered sites. Loss of scientific knowledge.	Significant
Amenity Values	Agriculture, mining. Visible from Highway 49. Low aesthetic and scenic value.	Changes in landscape except when actively mined.	Insignificant
Special Management Areas/ Unique Resource Impacts	No wilderness, special management, or ACEC's in the area.	Elimination of options for designation in the future	Insignificant

TRACT RANKING SUBFACTORS	PRESENT SITUATION	ANTICIPATED EFFECT OF LEASING/DEVELOPMENT	SIGNIFICANCE OF ANTICIPATED IMPACT
Other Land Use & Transportation	Agriculture, coal mining.	Displacement of existing agricultural use. Relocation of exsiting roads and utilities.	Insignificant
Reclamation Potential	6% of the area has been rated "poor" for reclamation.	Reclamation may be unsuccessful in more areas. Reestablishment of vegetation would be difficult. Higher reclamtion cost.	Insignificant
Unsuitability Criteria	Buffer zones deferred to mine plan. Cultural, federal and state listed endangered species, eagle nests, roost and concentration areas, falcon nesting sites, migratory birds, and state resident fish and wildlife need further study.	Not Applicable	Not Applicable
	SOCIAL AND ECONOMIC		
Economic Changes	Population and employment levels forecasted relatively stable through 2000 A.D. Regional income to increase moderately.	Very small if any increase in population. Regional income would increase slightly.	Insignificant
Community Service Assessment	Most services adequate, often with one or two inadequate services in local communities.	No change in adequacy.	Insignificant
Public Attitudes	Not Applicable	Not Applicable	Not Applicable
Lifestyle and Social Structure	Not Applicable	Not Applicable.	Not Applicable
Agricultural Operations	There are 27 operators in the tract. There are 3,339 acres of cropped land and 2,622 AUMs.	Operators affected by long-term loss of production. Average annual loss of 86 acres (2,167 bu. of wheat) excluding 1,731 acres of summer fallow. Maximum loss/peak mining year= 857 acres (21,596 bu. of wheat).	Significant
Consistency with other Plans and Policies	BLM - Management Framework Plan of 1980.	Not Applicable	Not Applicable

UNDERWOOD

The Underwood tract is in McLean County, North Dakota. It surrounds the town of Underwood. The land is primarily used for farming and ranching.

The tract contains about one percent (10.2 million tons) of the federal coal under current consideration in the Fort Union Region. One economically recoverable seam of lignite coal, which is nine feet thick on the average, underlies the tract. Overburden ranges from 0 to 129 feet in thickness.

The generic mining plan calls for a surface mine using draglines, electric shovels, bottom-dump coal haulers, scrapers, and other support equipment. The nearby Coal Creek Power Plant would probably utilize the mined coal.

The Underwood tract includes the Falkirk mine. The mine opened in 1978 and produces 5.6 million tons of coal annually for the Coal Creek Power Plant. The tract is north and east of the center of major coal development in North Dakota. Within a 30 mile radius south and west of the tract are 4 producing mines and one under construction. All the mines do or will produce coal for power plants in the same vicinity.

The amount of federal coal in the tract is minimal and the individual parcels are scattered. Any mine on this tract could probably operate without the federal coal, but if the federal coal is not leased, it will probably be bypassed.

The tract is in the Williston Basin, where oil and gas exploration, discovery, and production are increasing.

The land is used primarily for farming and ranching.

SITE SPECIFIC ANALYSIS

Minerals

Because the tract is located in the Williston Basin, it has a potential for oil and gas development. Coal mining and associated operations preclude or inhibit certain phases of oil and gas exploration and production. Coal mining could delay exploration activities for six to eight years or even for the entire life of the mine.

Wildlife

Mining would eliminate the unique unfarmed wildlife habitat on the tract. High density wetlands, native woodlands, and remnant interspersed native prairie would be destroyed.

Cultural

Information on cultural resource values in the area is scarce. The tract could contain significant archaeological or historical sites and/or artifacts. Loss of these resources (due to mining) can be considered significant, unless more information is collected to indicate otherwise. Additional inventory would raise the level of confidence that loss would or would not occur. The loss of identified values, if any exist, would be long-term and irreversible.

Reclamation

Some instability problems such as area-wide settling or localized subsidence could occur. The extent of these problems would depend on reclamation planning and operation. Over the long run, the original productivity level of the soils should return to the tract.

Economic and Social

The mining employment level in the area would not change significantly if the Underwood tract were to be leased. The population level of the surrounding communities would therefore remain stable, and no additional impacts to community services or changes in social conditions would result.

The only effect on community services of leasing would be to continue the existing level of demand for these services for an additional 40 years (life of the mine).

Agriculture

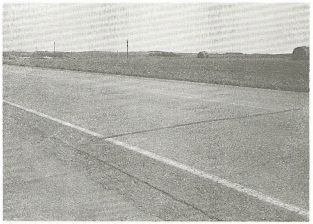
The proposed action would progressively remove an average of 431 acres of the total area per year from agricultural production.

An average of 190 acres of cropland, excluding summer fallow, would be removed from production from these operations each year. Average annual loss would be about 5,453 bushels of wheat. This cropland would be out of production ten years. The maximum annual loss would be about 53,985 bushels of wheat.

Peak mining year disturbance of 137 acres of hayland would result in an annual loss of 267 tons of hay production.

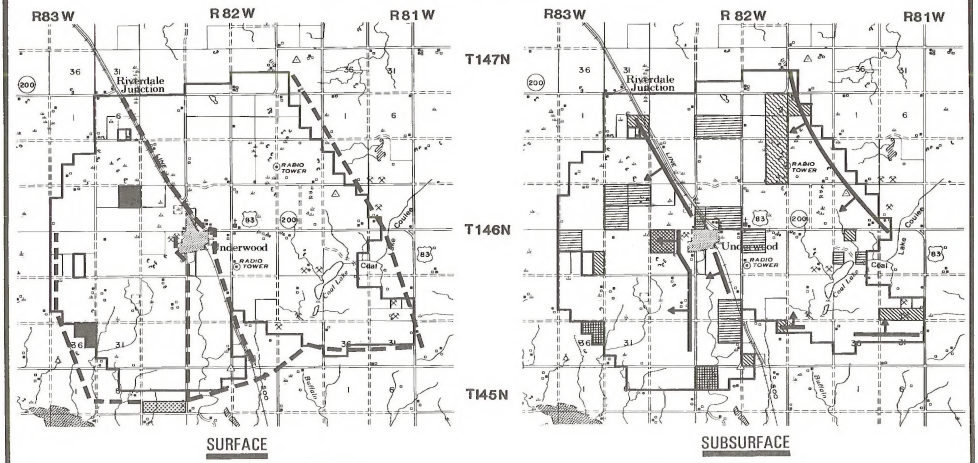
An average of 103 acres of rangeland would also be removed from production each year, resulting in an average loss of 62 AUMs (animal unit months). This rangeland would be out of production ten years with a maximum 1,034 acres out of production in any one peak mining year. The maximum annual loss would be about 620 AUMs.

Regionally, these losses would not pose significant reductions in area agricultural production. The individual operators would be severely impacted.



Peak mining year disturbance of 137 acres of hayland would result in an annual loss of 267 tons of hay.

UNDERWOOD TRACT



UNDERWOOD
SITE-SPECIFIC SUMMARY MATRIX

COAL ECONOMICS

TRACT RANKING SUBFACTORS	PRESENT SITUATION	COMMENTS	INFORMATION SOURCE
Coal Quality	Lignite: Averages 6,600 Btus/lb. Sulfur: 0.5% Average.		USGS
Coal Quantity	Total Recoverable - 290.1 million tons. State - 18.7 million tons. Federal Leased 2.2 million tons. Federal Unleased 10.2 million tons.		USGS
Coal conservation and Maintenance of Production	90% recovery rate. Prevention of bypass of federal coal.		USGS/BLM
Energy Production	Net energy analysis. About 37.7 Btus to produce one lb. of coal.	Net energy analysis 1 Btu expended for 175 Btus produced.	BLM
Likelihood of Leasing and Development	Good, expression of leasing from Falkirk Mining Co.	The Falkirk mine is operating within the tract.	BLM

IMPACTS TO THE NATURAL ENVIRONMENT

TRACT RANKING SUBFACTORS	PRESENT SITUATION	ANTICIPATED EFFECT OF LEASING/DEVELOPMENT	SIGNIFICANCE OF ANTICIPATED IMPACT
Air Quality	Good	Totally consumes the allowable Class II PSD 24-hour increment for particulates.	Significant
Minerals Other than Coal	Some oil and gas potential.	Delay of exploratory drilling and oil and gas development.	Significant.
Water	Aquifer recharge on tract. Poor quality (non-potable)	Temporary loss of the use of local wells.	Insignificant
Wildlife	Native prairie 37%, woodlands 25% and wetlands 10%.	Would be destroyed. Reclamation unsure. Adverse impacts from human population increase.	Significant on and around tract. Unknown on a regional basis.
Cultural Features	35% of tract inventoried with no cultural site being recorded to date.	Potential destruction of scientific knowledge.	Significant
Amenity Values	Mining in region. Tract is agricultural.	Change in character of the tract. Mining would "fit" as an activity in the region.	Insignificant
Special Management Areas/ Unique Resource Impacts	No wilderness, special management, or ACEC's in the area.	Closes options for future designation.	Insignificant

TRACT RANKING SUBFACTORS	PRESENT SITUATION	ANTICIPATED EFFECT OF LEASING/DEVELOPMENT	SIGNIFICANCE OF ANTICIPATED IMPACT
Other Land Use & Transportation	Agricultural	Displacement of existing agricultural use. Relocation of exsiting roads and utilities.	Insignificant
Reclamation Potential	1% of the area has been rated "poor" for reclamation.	Reclamation would likely be successful.	Insignificant
Unsuitability Criteria	Buffer zones deferred to mining plan. Cultural, federally listed endangered species, Bald and Golden Eagle nests, floodplains, Bald and Golden Eagle roost and concentration areas, Falcon nesting sites, migratory birds, and state resident fish and wildlife need further study.	Not Applicable	Not Applicable
	SOCIAL AND ECONOMIC		
Economic Changes	Population and employment levels forecasted relatively stable through 2000 A.D. Regional income to increase moderately.	Very small if any increase in population. Regional income would increase slightly.	Insignificant
Community Service Assessment	Most services adequate, often with one or two inadequate services in local communities.	No change in adequacy.	Insignificant
Public Attitudes	Not Applicable	Not Applicable	Not Applicable
Lifestyle and Social Structure	Not Applicable	Not Applicable.	Not Applicable
Agricultural Operations	There are 10 operators in the tract. There are 2,649 acres of cropped land and 874 AUMs.	Operators affected by long-term loss of production. Average annual loss of 190 acres (5,453 bu. of wheat) excluding 1,759 acres of summer fallow. Maximum loss/peak mining year= 1,881 acres (53,985 bu. of wheat).	Significant
Consistency with other Plans and Policies	BLM - Management Framework Plan of 1980.	Not Applicable	Not Applicable

NORTH BEULAH

The North Beulah tract is about two miles northwest of Beulah, North Dakota. The land is primarily used for farming and ranching.

The tract contains about one-half of one percent (6.4 million tons) of the federal coal under current consideration in the Fort Union Region. The federal coal is in small scattered parcels. A mine could probably operate without taking the federal coal, which would then probably be permanently bypassed. The tract contains one economically recoverable seam of lignite coal, which averages 12 feet thick. Overburden ranges up to 200 feet in thickness.

The generic mining plan calls for a surface mine using draglines, electric shovels, bottom-dump coal haulers, scrapers, and other support equipment. An electric generating plant would utilize the mined coal.

The inactive Beulah mine lies directly east of the tract. The nearest active mines are North American's Indianhead mine (2 miles southwest) and Knife River's Beulah mine (5 miles southeast). The tract is in the Williston Basin, where oil and gas exploration, discovery, and production are increasing.

The land is used primarily for farming and ranching.

SITE SPECIFIC ANALYSIS

Air Quality

An air quality modeling analysis was undertaken. The projected air quality impacts resulting from the mine operation were compared to applicable state and federal ambient air quality standards as well as state Prevention of Significant Deterioration (PSD) regulations.

A mine on the North Beulah tract was shown to comply with the state ambient air quality standards and the Class II PSD annual standards; however, the 24-hour particulate standards (which cannot be exceeded more than once per year) could possibly be violated during times of strong winds and peak production.

Minerals

Because the tract is located in the Williston Basin, it has a potential for oil and gas development. Coal mining and associated operations preclude or inhibit certain phases of oil and gas exploration and development. Coal mining could delay exploration activities for six to eight years or even for the entire life of the mine.

Wildlife

Mining would eliminate the unique unfarmed wildlife habitat on the tract. Some wetlands and native woodlands would be lost. Most of the tract contains remnants of interspersed native prairie that also would be destroyed.

Cultural

The entire surface of the North Beulah tract has been inventoried intensively for cultural resources. Bison-kill sites, habitation sites, and lithic artifacts have been identified. These are fairly typical of archaeological finds in the area. Additional undiscovered cultural resources may also be present. Their loss would be an irreversible impact.

Aesthetics

Although the badlands scenery is common in the area, the reclaimed landscape would not replace the wind and water formed shapes. These shapes attract attention by their odd appearance and vertical orientation. This loss can be considered a significant impact.

Reclamation

Some instability problems such as area-wide settling or localized subsidence could occur. The extent of these problems would depend on reclamation planning and operation. Over the long run, the original productivity level of the soils should return to the tract.

Economic and Social

Presumably, one of the two active mines near Beulah would expand into the North Beulah tract. If so, the employment level of the mine would not change significantly. The population level of the surrounding communities would remain stable, and no additional impacts to community services or changes in social conditions would result.

The only effect of leasing on community services would be to continue the existing level of demand for these services for an additional 40 years (life of the mine).

Agriculture

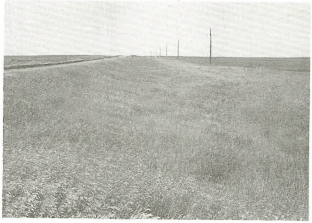
Mining the tract would require taking an average of 87 acres out of agricultural production each year.

An average of 10 acres of cropland, excluding summer fallow, would be removed from production each year, resulting in an average loss of 250 bushels of wheat. This cropland would be out of production ten years with a maximum of 104 acres out of production in any one peak mining year. The maximum annual loss would be about 2,600 bushels of wheat.

Peak mining year disturbance of 30 acres of hayland would result in an annual loss of 40 tons of hay production.

An average of 67 acres of rangeland would also be removed from production each year, resulting in an average loss of 33 AUMs (animal unit months). This rangeland would be out of production ten years with a maximum of 664 acres out of production in any one peak mining year. The maximum annual loss would be 332 AUMs.

Regionally, these losses would not pose significant reductions in area agricultural production, but they would be very significant to the operators involved.

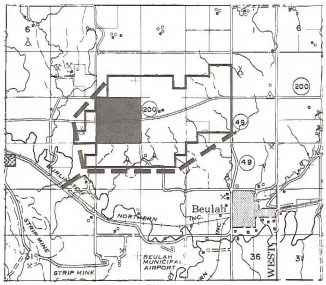


This terrain is typical of the tract.

NORTH BEULAH TRACT

T144N

R88W



SURFACE

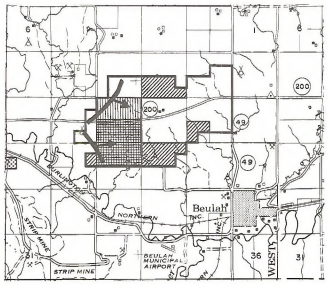
LEGEND

- State Surface
- Private Surface
- Tract Boundary
- Federal Coal
- State Coal
- Private Coal
- Leased State Coal
- Surface Facilities
- Out-of-Pit Haul Roads
- Pit Advancement

-N-

T144N

R88W



SUBSURFACE

0 1 2 3 4 5 6

Scale In Miles

NORTH BEULAH
SITE-SPECIFIC SUMMARY MATRIX

COAL ECONOMICS

TRACT RANKING SUBFACTORS	PRESENT SITUATION	COMMENTS	INFORMATION SOURCE
Coal Quality	Lignite: Averages 6,919 Btus/lb. Sulfur: 0.8% Average.		USGS
Coal Quantity	Total Recoverable - 43.4 million tons. State - 9.6 million tons. Federal 6.4 million tons.		USGS
Coal conservation and Maintenance of Production	90% recovery rate. Prevention of bypass of federal coal.		USGS
Energy Production	Net energy analysis. About 38 Btus to produce one lb. of coal.	Net energy analysis 1 Btu expended for 184 Btus produced.	BLM/USGS
Likelihood of Leasing and Development	One specific Expression of Leasing Interest for the North Beulah Coal Deposit.		BLM

IMPACTS TO THE NATURAL ENVIRONMENT

TRACT RANKING SUBFACTORS	PRESENT SITUATION	ANTICIPATED EFFECT OF LEASING/DEVELOPMENT	SIGNIFICANCE OF ANTICIPATED IMPACT
Air Quality	Good	Totally consumes the allowable Class II PSD 24-hour increment for particulates.	Significant
Minerals Other than Coal	High interest in oil and gas in the region - low interest in the tract.	Delay of exploration and development during active mining. Low potential for conflict.	Insignificant.
Water	Used for domestic and livestock use.	No effect on existing use.	Insignificant
Wildlife	Native prairie, woodlands, and wetlands on tract.	Would be destroyed. Reclamation unsure. Adverse impacts from human population increase.	Significant on and around tract. Unknown on a regional basis.
Cultural Features	100% of tract inventoried.	Potential loss of significant undiscovered sites. Recorded sites will not affect mining.	Significant
Amenity Values	Badlands. Agriculture. High visual quality, moderate scenic values.	Permanent loss of visual amenity.	Significant
Special Management Areas/ Unique Resource Impacts	No wilderness, special management, or ACEC's in the area.	Elimination of options for future designation.	Insignificant

TRACT RANKING SUBFACTORS	PRESENT SITUATION	ANTICIPATED EFFECT OF LEASING/DEVELOPMENT	SIGNIFICANCE OF ANTICIPATED IMPACT
Other Land Use & Transportation	Agriculture, coal mining, local roads and utilities.	Displacement of existing agricultural use. Relocation of exsiting roads and utilities.	Insignificant
Reclamation Potential	13% of the area has been rated "poor" for reclamation.	Potential for unsuccessful reclamation on some of the tract. Increased costs for reclamation.	Insignificant
Unsuitability Criteria	Buffer zones deferred to mine plan. Federally listed endangered species needs further study.	Not Applicable	Not Applicable
	SOCIAL AND ECONOMIC		
Economic Changes	Population and employment levels forecasted relatively stable through 2000 A.D. Regional income to increase moderately.	Very small if any increase in population. Regional income would increase slightly.	Insignificant
Community Service Assessment	Most services adequate, often with one or two inadequate services in local communities.	No change in adequacy.	Insignificant
Public Attitudes	Not Applicable	Not Applicable	Not Applicable
Lifestyle and Social Structure	Not Applicable	Not Applicable.	Not Applicable
Agricultural Operations	There are 7 operators in the tract. There are 362 acres of cropped land and 1,328 AUMs.	Operators affected by long-term loss of production. Average annual loss of 10 acres (250 bu. of wheat) excluding 287 acres of summer fallow. Maximum loss/peak mining year= 104 acres (2,600 bu. of wheat).	Significant
Consistency with other Plans and Policies	BLM - Management Framework Plan of 1980.	Not Applicable	Not Applicable

RENNER

The Renner tract is in Mercer County, North Dakota, about one mile north of the town of Zap. The land is primarily used for farming and ranching.

The tract contains about 7 percent (110.5 million tons) of the federal coal under current consideration in the Fort Union Region. One economically recoverable seam of lignite coal, which averages 15 feet in thickness, underlies the tract. Overburden ranges up to 200 feet in thickness.

Mercer County is the center of coal energy development in North Dakota. Parts of the Renner and the Antelope tracts are included in a mining proposal by Coteau Properties, Inc. to develop a mine capable of eventually producing 14.6 million tons of coal annually for the Antelope Valley Power Plant that is under construction and the ANG (Great Plains Coal Gasification Plant). Both tracts are in the Renners Cove deposit. The Antelope tract is just to the northeast of the Renner tract. The Nokota Company has proposed a mine and liquefaction plant near Dunn Center, about 30 miles west of the Renner tract. North American Coal Corporation's Indianhead mine, 8 miles south of the tract, supplies 1.2 million tons of coal annually to the Stanton Power Plant. Knife River's Beulah mine, 15 miles southeast, produces 2.2 million tons of coal annually for the recently constructed Coyote 1 Power Plant. Consolidation Coal Company's Glenharold mine, 24 miles southeast, supplies 3.8 million tons of coal annually to the Leland Olds Power Plant. The Baukol Noonan, Inc.'s Center mine, 35 miles southeast of the area, produces 4.1 million tons annually for the Milton R. Young Power Plant. North American's Falkirk mine, about 25 miles to the east, supplies 5.6 million tons of coal annually to the Coal Creek Power Plant.

The tract is located in the Williston Basin where petroleum exploration, discovery, and production are increasing.

Mining would remove some of the unique unfarmed habitat on the tract.

The generic mining plan calls for a surface mine using draglines, electric shovels, bottom-dump coal haulers, scrapers and other support equipment. The Great Plains Coal Gasification Plant (ANG) would probably utilize the mined coal.

SITE SPECIFIC ANALYSIS

Air Quality

An air quality modeling analysis was undertaken. The projected air quality impacts resulting from the mine operation were compared to applicable state and federal ambient air quality standards as well as state Prevention of Significant Deterioration (PSD) regulations.

A mine on the Renner tract was shown to comply with the state ambient air quality standards and the Class II PSD annual standards; however, the 24-hour particulate standards (which cannot be exceeded more than once per year) could possibly be violated during times of strong winds and peak production.

Minerals

Because the tract is located in the Williston Basin, it has a potential for oil and gas development. Coal mining and associated operations preclude or inhibit certain phases of oil and gas exploration and developments. Coal mining could delay exploration activities for six to eight years or even for the entire production life of the mine.

Wildlife

Mining would eliminate the unique unfarmed wildlife habitat of the Missouri River on the tract. Some wetlands, native woodlands, and remnant interspersed native prairie would be destroyed.

Cultural

There is recorded information on cultural resource values in the area. The tract could contain significant archaeological or historical sites and/or artifacts. Loss of these resources (due to mining) could be considered significant, unless more information is collected to indicate otherwise. Thus far, none of the identified cultural sites would preclude mining the federal coal under current consideration. The loss of identified values, if any exist, would be long-term and irreversible.

Reclamation

Some instability problems such as area-wide settling or localized subsidence could occur. The extent of these

problems would depend on reclamation planning and achievement. Over the long run, the original productivity level of soils should return to the tract.

Economic and Social

Peak employment during the construction phase of the mine is expected to occur in 1986 at 225 employees, with full operations employment expected in 1992 at 340 employees. Beulah, Hazen, Zap, Stanton, and Golden Valley all would experience increases in both population and employment. None would have inadequate levels of community services as a direct result of the 1986 peak construction employment/population levels; however, Golden Valley would likely have inadequate police service resulting from the 1992 full operation levels. Even though the mine-related growth would not directly cause community service inadequacies, inadequate services in all five towns would be further strained.

Several other communities would also receive population increases; however, the projected increases (most less than one percent) would not significantly affect community service adequacy.

In terms of absolute changes, the Bismarck-Mandan area in Morton and Burleigh counties would receive well over half of the total population increase due to opening and operating the Renner mine. However, because Bismarck and Mandan have large population bases compared to other communities in the area, the population impacts from the operational phase of the Renner mine would not be as great there as they would be in Beulah and Hazen (Mercer County), where new residents would be more noticeable. Because newcomers would be more conspicuous, and because population impacts from operating the mine would be concentrated in Mercer County, the most pronounced social structural changes due to the mine would be in the Beulah-Hazen area.

Mercer County is somewhat diversified economically and socially. Its economic base includes both energy and agriculture. Population growth during the past few years has been fairly steady. Beulah and Hazen are moderately sized cities where considerable coal development (including mining, plant construction, and plant operation) has occurred. Therefore, opening and operating the Renner mine probably would not present pronounced difficulties for either community. Many changes attributable to coal development have been and are occurring today. Additional cumulative effects due to the Renner mine would not likely cause significant changes in the institutional characteristics of Beulah or Hazen.

Higher population growth levels would occur from the operational phase of the Renner mine than from the construction phase. Much of the operational growth is expected to be in the Bismarck-Mandan area. Short-term instabilities in Beulah and Hazen that might be attributed to the Renner mine would thus be avoided.

Community leaders in Beulah and Hazen have worked recently with growth related problems. The history of mining in the area has provided these leaders with considerable experience in managing growth. Many other Northern Plains communities where rapid coal development growth might occur in the future have not had this experience.

Opening and operating the mine would likely have noticeable effects as far as the overall quality of life in both Mercer County and in Burleigh-Morton counties is concerned. The growth levels attached to the mine are significant during the short and long term. Residents' satisfaction with the existing social environment, in particular relationships between people, would be jeopardized because the mine would represent one more source of segmentation and increased formality.

Positive impacts to area characteristics as perceived by residents in a BLM random sample survey would be the possible improvement of retail, medical, and entertainment opportunities. Firms might be attracted to the area to fill these needs. However, since some residents already express dismay with the recent growth, the number of newcomers, and an altered social environment, it is not likely that perceived quality of life for the residents would be enhanced. If anything, there would be a minor but noticeable degradation for these persons.

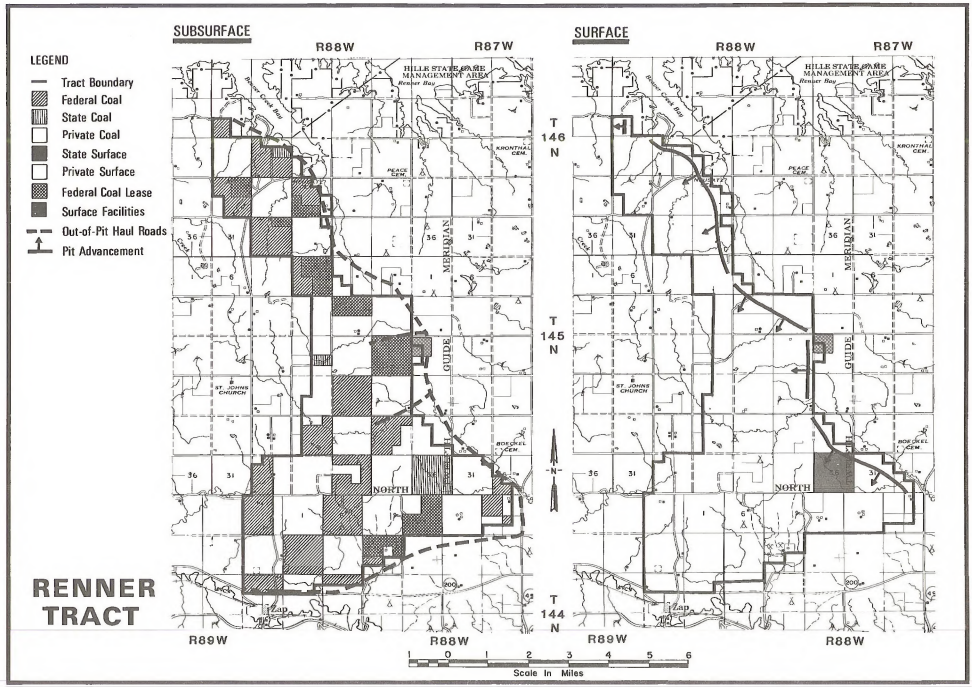
Agriculture

Mining would require taking an average of 490 acres out of agricultural production each year. An average of 83 acres of cropland, excluding summer fallow, would be removed from production each year, resulting in an average annual loss of 2,083 bushels of wheat. This cropland would be out of production ten years, with a maximum of 808 acres out of production in any one peak mining year. In total, the maximum annual loss would be about 20,202 bushels of wheat.

Peak mining years disturbance of 374 acres of hayland would result in an annual loss of 505 tons of hay production.

An average of 348 acres of rangeland would also be removed from production each year, resulting in an average loss of 174 AUMs (animal unit months). This rangeland would be out of production ten years, with a maximum of 3,446 acres out of production in any one peak mining year. The maximum annual loss would be about 1,723 AUMs.

Regionally, these losses would not pose significant reductions in area agricultural production. However, some individual operators would be severely impacted.


SUBSURFACE
SURFACE
LEGEND
Tract Boundary
Federal Coal
State Coal
Private Coal
State Surface
Private Surface
Federal Coal Lease
Surface Facilities
Out-of-Pit Haul Roads
Pit Advancement
RENNER TRACT
R88W
R87W
R89W
T 146 N
T 145 N
T 144 N
HILLE STATE GAME MANAGEMENT AREA
Renner Bay
Renner Creek Bay
KRONTHAL CEM.
PEACE CEM.
ST. JOHNS CHURCH
BOECKEL CEM.
MERIDIAN
GUIDE
NORTH
Zap
Scale In Miles
1 0 1 2 3 4 5 6

RENNER
SITE-SPECIFIC SUMMARY MATRIX

COAL ECONOMICS

TRACT RANKING SUBFACTORS	PRESENT SITUATION	COMMENTS	INFORMATION SOURCE
Coal Quality	Lignite: Averages 6,919 Btus/lb. Sulfur: 0.8% Average.		USGS
Coal Quantity	Total Recoverable - 410.9 million tons. State - 21.4 million tons. Federal Leased 50.8 million tons. Federal Unleased - 110.5 million tons.		USGS
Coal conservation and Maintenance of Production	90% recovery rate. Production maintenance.		USGS/BLM
Energy Production	Net energy analysis. About 37.7 Btus to produce one lb. of coal.	Net energy analysis 1 Btu expended for 183.5 Btus produced.	BLM
Likelihood of Leasing and Development	Good	Would be part of the mine needed to support Antelope Valley Power Plant and ANG gasification plant.	BLM

IMPACTS TO THE NATURAL ENVIRONMENT

TRACT RANKING SUBFACTORS	PRESENT SITUATION	ANTICIPATED EFFECT OF LEASING DEVELOPMENT	SIGNIFICANCE OF ANTICIPATED IMPACT
Air Quality	Good	Possibly violate state and federal ambient TSP standards. Totally consumes the allowable Class II PSD increment for particulates.	Significant
Minerals Other than Coal	Interest in oil and gas exploration and development is high in the region but low for the tract.	Delay of exploration and development during active mining. Potential for conflict is very low.	Insignificant
Water	Unpotable water.	Temporary loss of stock watering during mining.	Insignificant
Wildlife	Native prairie 59%, woodlands 5% and wetlands 2%.	Would destroy habitat. Reclamation unsure. adverse impacts from human population increase.	Significant on and around tract. Unknown on a regional basis.
Cultural Features	52% of the tract inventoried.	Potential loss of significant undiscovered sites. Recorded sites will not affect coal mining.	Significant
Amenity Values	Agriculture character, mining moderate aesthetic value, low scenic value.	Activity is characteristic of the region and should be accepted.	Insignificant

TRACT RANKING SUBFACTORS	PRESENT SITUATION	ANTICIPATED EFFECT OF LEASING/DEVELOPMENT	SIGNIFICANCE OF ANTICIPATED IMPACT
Special Management Areas/ Unique Resource Impacts	No wilderness, special management, or ACEC's in the area.	Elimination of options for designation in the future	Insignificant
Other Land Use & Transportation	Agriculture, coal mining.	Displacement of existing use in short term. Relocation of transportation and utilities.	Insignificant
Reclamation Potential	10% of the area has been rated "poor" for reclamation.	Reclamation may be unsuccessful in more areas. Higher reclamtion cost.	Insignificant
Unsuitability Criteria	Buffer zones deferred to mine plan. Cultural, federal, and state listed endangered species, eagle nests, roost and concentration areas, falcon nesting sites, migratory birds, and state resident fish and wildlife need further study.	Not Applicable	Not Applicable
	ECONOMIC AND SOCIAL		
Economic Changes	Population and employment levels forecasted relatively stable through 2000 A.D. Regional income to increase moderately.	Beulah, Golden Valley, Hazen, Stanton, and Zap would experience population changes. Regional income would increase slightly.	Significant
Community Service Assessment	Beulah, Golden Valley, Hazen, Stanton and Zap have one or more inadequate services. Resident perception of problem areas include: law enforcement, recreation, medical and retail services.	One service would become inadequate in Golden Valley.	Significant
Public Attitudes	Generally support (conditionally) coal development.	Not Applicable	Not Applicable
Lifestyle and Social Structure	Most residents favor the informal atmosphere, and outdoor recreation opportunities.	Some slight deterioration of quality of life in Mercer, Burleigh, and Morton Counties.	Not Applicable
Agricultural Operations	There are 40 operators in the tract. There are 7,236 acres of cropped land and 6,909 AUMs.	Operators affected by long-term loss of production. Average annual loss of 83 acres (2,083 bu. of wheat) excluding 1,033 acres of summer fallow. Maximum loss/peak mining year= 808 acres (20,202 bu. of wheat).	Significant
Consistency with other Plans and Policies	BLM - Management Framework Plan of 1980.	Not Applicable	Not Applicable

ANTELOPE

The Antelope tract is in Mercer County, North Dakota, about six miles north of the town of Zap. The land is primarily used for farming and ranching.

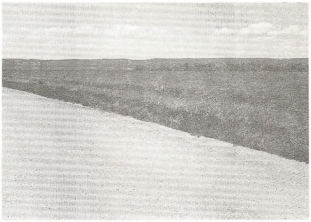
The tract contains one percent (12.5 million tons) of the federal coal under current consideration in the Fort Union Region. One economically recoverable seam of lignite coal, which averages 17 feet in thickness, underlies the tract. Overburden ranges up to 200 feet in thickness.

The generic mining plan calls for a surface mine using draglines, electric shovels, bottom-dump coal haulers, scrapers, and other support equipment. The Antelope Valley Power Plant would probably utilize the mined coal.

Mercer County is a center of coal energy development in North Dakota. The North American Coal Corporation's Indianhead mine, 8 miles south of the Antelope tract, supplies 1.2 million tons of coal annually to the Stanton Power Plant. North American's Falkirk mine, about 25 miles to the east, supplies 5.6 million tons of coal annually to the mine mouth Coal Creek Power Plant. Knife River's Beulah mine, 15 miles southeast, produces 2.2 million tons of coal for the recently constructed Coyote 1 Power Plant. Consolidation Coal Company's Glenharold mine, 24 miles southeast, supplies 3.8 million tons of coal annually to the Leland Olds Power Plant. The Baukol Noonan Inc.'s Center mine, about 35 mile southeast of the area, produces 4.1 million tons annually for the Milton R. Young Power Plant.

The Nokota Company proposes a mine and indirect liquefaction plant near Dunn Center, 35 miles to the west. Coteau Properties, Inc. has a mining plan application pending before the North Dakota Public Service Commission that includes part of the Antelope tract. The Coteau mine will produce about 14.6 million tons annually for the ANG Coal Gasification Plant and the Antelope Power Plant when they are in full production. Additional coal will likely come from the Renner tract. Both plants are under construction just west of the Antelope tract.

Individual federal parcels are scattered throughout the tract. A little over 16 million tons of federal coal has been leased. If the pending mining plant application is approved, production could reach 5.2 million tons annually without the additional federal coal. The unleased 12.5 million tons of federal coal would be bypassed if additional leasing is not approved. The tract is located in the Williston Basin where petroleum exploration, discovery, and production are increasing.



Individual federal parcels of coal are scattered throughout the tract where farming and ranching are the primary uses.

SITE SPECIFIC ANALYSIS

Air Quality

An air quality modeling analysis was undertaken. The projected air quality impacts resulting from the mine operation were compared to applicable state and federal ambient air quality standards as well as state Prevention of Significant Deterioration (PSD) regulations.

A mine on the Antelope tract was shown to comply with the state ambient air quality standards and the Class II PSD annual standards; however, the 24-hour particulate standards (which cannot be exceeded more than once per year) could possibly be violated during times of strong winds and peak production.

Minerals

Because the tract is in the Williston Basin, it has a potential for oil and gas development. Coal mining and associated operations preclude or inhibit certain phases of oil and gas exploration and development. Coal mining could delay exploration activities for six to eight years or even for the entire productive life of the mine.

Wildlife

Mining on the tract would eliminate the unique unfarmed wildlife habitat on the tract. Wetlands, native woodlands, and remnant interspersed native prairie would be destroyed.

Cultural

There is recorded information on cultural resource values in the area. The tract could contain significant archaeological or historical sites and/or artifacts. Loss of these resources (due to mining) can be considered significant, unless more information is collected to indicate otherwise. Thus far, none of the identified archaeological sites would preclude mining the federal coal under current consideration. The loss of cultural resource values, if any exist, would be long-term and irreversible.

Reclamation

Some instability problems such as area-wide settling or localized subsidence could occur. The extent of these problems would depend on reclamation planning and achievements. Over the long run, the original agricultural productivity level of soil should return to the tract.

Economic and Social

The employment level of the area probably would not change significantly if the Antelope tract would be leased. Without a change in mine employment, the population level of the surrounding communities would remain stable. No additional impacts to community services would result; the only effect of leasing would be to continue the existing level of demand for these services for an additonal 40 years (life of the mine).

Agriculture

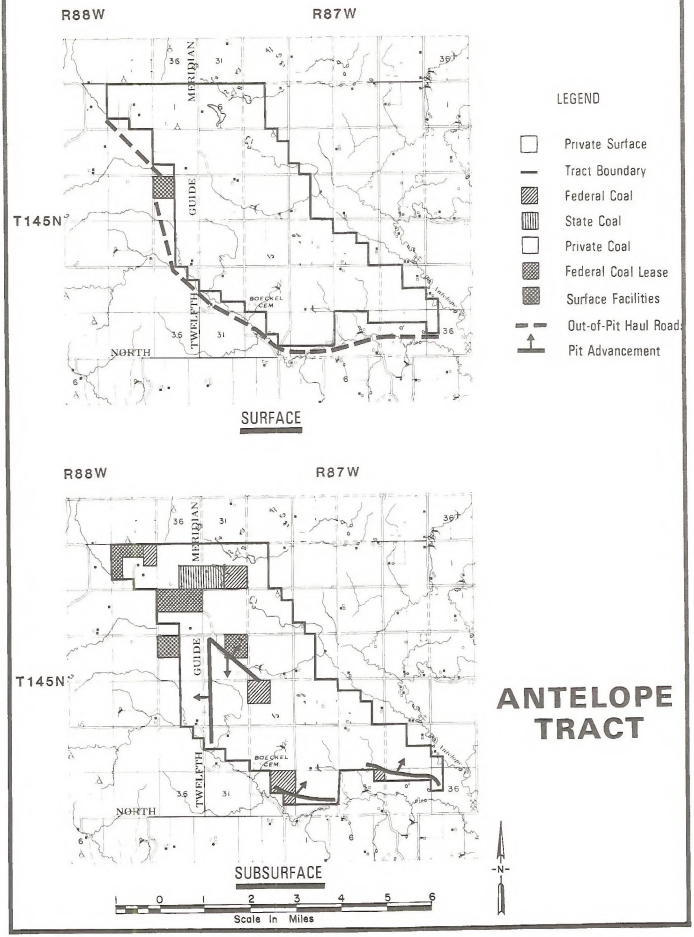
Mining the tract would require taking an average of 198 acres out of agricultural production each year.

An average of 71 acres of cropland, excluding summer fallow, would be removed from production each year. This would be an average annual loss of 1,775 bushels of wheat. This cropland would be out of production ten years with a maximum loss of 705 acres out of production in any one peak mining year. In total, the maximum annual loss would be approximately 17,625 bushels of wheat.

Peak mining year disturbance of 118 acres of hayland would result in an annual loss of 159 tons of hay production.

An average of 83 acres of rangeland would also be removed from production each year, resulting in an average loss of 42 AUMs (animal unit months). This rangeland would be out of production ten years with a maximum of 940 acres out of production in any one peak year, resulting in a maximum annual loss of 420 AUMs.

These losses would not significantly reduce regional agricultural production; however individual operators would be severely impacted.


R88W
R87W
T145N
MERIDIAN
GUIDE
TWELFTH
BOECKEL CEM
NORTH
SURFACE
LEGEND
Private Surface
Tract Boundary
Federal Coal
State Coal
Private Coal
Federal Coal Lease
Surface Facilities
Out-of-Pit Haul Road
Pit Advancement
SUBSURFACE
ANTELOPE TRACT
N
0 1 2 3 4 5 6
Scale In Miles

ANTELOPE
SITE-SPECIFIC SUMMARY MATRIX

COAL ECONOMICS

TRACT RANKING SUBFACTORS	PRESENT SITUATION	COMMENTS	INFORMATION SOURCE
Coal Quality	Lignite: Averages 6,919 Btus/lb. Sulfur: 0.8% Average.		USGS
Coal Quantity	Total Recoverable - 260.3 million tons. State - 8.5 million tons. Federal Leased 16.1 million tons. Federal Unleased 12.5 million tons.		USGS
Coal conservation and Maintenance of Production	90% recovery rate. Prevention of bypass of federal coal.		USGS
Energy Production	Net energy analysis. About 37.7 Btus to produce one lb. of coal.	Net energy analysis 1 Btu expended for 184 Btus produced.	BLM/USGS
Likelihood of Leasing and Development	Good. One specific Expression of Leasing Interest by Coteau Properties, Inc.	End use would likely be for a power plant.	BLM

IMPACTS TO THE NATURAL ENVIRONMENT

TRACT RANKING SUBFACTORS	PRESENT SITUATION	ANTICIPATED EFFECT OF LEASING/DEVELOPMENT	SIGNIFICANCE OF ANTICIPATED IMPACT
Air Quality	Good	Totally consumes the allowable Class II PSD 24-hour increment for particulates.	Significant
Minerals Other than Coal	High interest in oil and gas in the region - low interest locally.	Delay in oil and gas exploration and development.	Insignificant.
Water	Water is not potable.	Local deterioration of groundwater. Interruption of local livestock water.	Insignificant
Wildlife	Native prairie, woodlands, and wetlands on tract.	Would be destroyed. Reclamation unsure. Adverse impacts from human population increase.	Significant on and around tract. Unknown on a regional basis.
Cultural Features	55% of tract inventoried.	Potential loss of significant undiscovered sites. Recorded cultural resources will not affect coal mining.	Significant
Amenity Values	Agricultural character. High aesthetic quality, low scenic value.	No important observer positions. The area does not influence important areas.	Insignificant

TRACT RANKING SUBFACTORS	PRESENT SITUATION	ANTICIPATED EFFECT OF LEASING/DEVELOPMENT	SIGNIFICANCE OF ANTICIPATED IMPACT
Special Management Areas/ Unique Resource Impacts	No wilderness, special management, or ACEC's in the area.	Elimination of options for future designation.	Insignificant
Other Land Use & Transportation	Agriculture, minor roads and utilities.	Displacement of existing agricultural use. Relocation of exsiting roads and utilities.	Insignificant
Reclamation Potential	7% of the area has been rated "poor" for reclamation.	Potential for reclamation is good.	Insignificant
Unsuitability Criteria	Buffer zones deferred to mine plan. Federally listed endangered species, eagle nests roosts and concentration areas, falcon nesting sites, migratory birds and state resident fish and wildlife need further study.	Not Applicable	Not Applicable
	SOCIAL AND ECONOMIC		
Economic Changes	Population and employment levels forecasted relatively stable through 2000 A.D. Regional income to increase moderately.	Very small if any increase in population. Regional income would increase minimally.	Insignificant
Community Service Assessment	Most services adequate, often with one or two inadequate services in local communities.	No change in adequacy.	Insignificant
Public Attitudes	Not Applicable	Not Applicable	Not Applicable
Lifestyle and Social Structure	Not Applicable	Not Applicable.	Not Applicable
Agricultural Operations	There are 7 operators in the tract. There are 1,331 acres of cropped land and 793 AUMs.	Operators affected by long-term loss of production. Average annual loss of 71 acres (1,775 bu. of wheat) excluding 582 acres of summer fallow. Maximum loss/peak mining year= 705 acres (17,625 bu. of wheat).	Significant
Consistency with other Plans and Policies	BLM - Management Framework Plan of 1980.	Not Applicable	Not Applicable

WERNER

The Werner tract is in Dunn County about two miles northeast of Dunn Center, North Dakota. The land is primarily used for farming and ranching.

The tract contains about 7 percent (112 million tons) of the federal coal under current consideration in the Fort Union Region. There are two economically recoverable seams of lignite coal which are 10.6 and 7.5 feet thick on the average. Overburden ranges from less than 150 feet to 200 feet in thickness.

The generic mining plan calls for a surface mine using draglines, electric shovels, bottom-dump coal haulers, scrapers, and other support equipment. An on-site electrical generation plant would likely utilize the mined coal.

The Nokota Company has proposed a coal methanol facility to be built just south of Dunn Center, in the Dunn Center tract. It would go into operation in the mid to late 1980s. Mercer County, bordering Dunn County on the east, is the center of coal development in North Dakota. There are six active mines and one mine being developed within 60 miles of Dunn Center. All but one of the mines are or will supply coal to power plants. The closest active mines are the Husky Industries and the Indianhead mines about 30 miles south and 30 miles east of Dunn Center respectively .

The tract is located in the Williston Basin, which produces an increasing amount of oil and gas.

Mining the tract would require an average of 321 acres out of agricultural production each year.

SITE SPECIFIC ANALYSIS

Minerals

Because the tract is located in the Williston Basin, it has the potential for oil and gas development. Coal mining and associated operations preclude or inhibit certain phases of oil and gas exploration. Coal mining could delay exploration activities for six to eight years or even for the entire life of the mine.

Wildlife

Mining would eliminate the unique unfarmed wildlife habitat on the tract, such as wetlands, woodlands, and native prairie. Off-site aquatic habitats in Spring Creek, and the Knife and Missouri rivers could potentially receive point and non-point pollution.

Cultural

There is some recorded information on cultural resource values in the area. The tract contains the significant Knife River flint quarries and habitation sites. Loss of these resources (due to mining) can be considered significant, unless more information is collected to indicate otherwise. Inventory would raise the level of confidence that loss would or would not occur. The loss of identified values would be long-term and irreversible.

Reclamation

Some instability problems of area-wide settling or localized subsidence could occur. The extent of the problems would depend on reclamation planning and results. Over the long run, the original agricultural productivity level of the soils should be restored.

Economic and Social

Construction and operation of the mine would result in significant impacts upon services in some communities. Dodge, Dunn Center, Halliday, and Killdeer would experience significant increases in both population and employment as the result of the development of the tract.

Peak employment during the construction phase of the mine is expected to occur in 1986 at 205 employees, with full operations employment expected in 1990 at 290 employees. By 1986, the communities of Dodge, Dunn Center, Halliday, and Killdeer would experience an inadequate level of one or more community services as a direct result of the peak construction employment/population levels. Some services, such as solid waste disposal in Halliday, would be inadequate by 1986 even without tract development. Mining-related population increases would simply make these inadequacies worse.

Full operation of the mine is also expected to result in serious impacts to area communities. Dodge, Dunn Center, Halliday, and Killdeer would all face public service inadequacies resulting directly from the population influx associated with mine operations. The rural areas of Dunn County would also receive mining-related population influx (though at a much lower level than the towns).

Other areas in North Dakota that would be affected by construction and operation of the Werner mine include Stark, Burleigh and Morton counties (Mandan and Bismarck) and Williams County (Williston). Bismarck and Mandan specifically would have some growth attributable to opening the mine.

Bismarck, Mandan, and Williston are quite large in population compared to other communities in the area. Growth caused by the Werner mine would be, for both the construction and operation phases, less than a 1 percent increase over baseline population levels. In these cities population growth of this magnitude would not result in a social environment noticeably different from the one that would exist without development.

The anticipated changes in social structure in Stark County are somewhat different. At peak construction Dickinson would be expected to have roughly 450 to 500 more persons than without development, and Belfield would have roughly 50 more persons. The difference between these population levels and the baseline population levels is about 2 to 3 percent. This would temporarily be noticed in increased traffic, pressure on services, crowding, and similar effects. However, during both the construction and operation phases this population growth should not affect the social structural characteristics of Stark County or of communities in the county.

In Dunn County, roughly three hundred persons above baseline would be expected at peak construction, with this increasing to about 500-600 during the operation phase. These numbers are substantial for Dunn County and the communities of Dunn Center, Halliday, Killdeer, Manning and Dodge. Communities in Dunn County are small and generally homogenous, and industrial activity has been limited. The opening of a mine would be expected to alter the social character of the area. Along with oil and gas development, coal mining would mean a shift away from the traditional economic base, agriculture. Some adaptations would occur(through the family, political, leisure, and occupational institutions), and it is not likely that chaotic conditions would be evident. The Werner mine would result in Dunn County's social life being altered, but not significantly.

While the Werner mine would not have profound structural implications for persons living in Stark and Dunn counties, it is likely that attributes now widely recognized as favorable would be somewhat further eroded. The area is currently being changed by growth associated with oil and gas development. The small town, informal atmosphere is highly appreciated by residents. These communities would likely become somewhat more depersonalized due to coal development. Simultaneously, those area characteristics that are not appreciated by residents (such as traffic, roads, presence of newcomers, shortage of medical care) would, due to opening the mine, become slightly more problematic for residents in Dunn and Stark counties. Sorting out the changes brought by coal development, from those brought on by oil and gas, would be very difficult.

Agriculture

Mining the tract would require taking an average of 321 acres out of agricultural production each year.

By the end of the mine life, 12,843 acres of the tract would be disturbed.

An average of 87 acres of cropland, excluding summer fallow, would be removed from production each year, resulting in an annual loss of 2,227 bushels of wheat. This cropland would be out of production ten years with a maximum of 861 acres out of production in any one peak mining year. In total, the maximum annual loss would be 22,042 bushels of wheat.

Peak mining year disturbance of 632 acres of hayland would result in an annual loss of 822 tons of hay production.

An average of 157 acres of rangeland would also be removed from production each year, resulting in an average loss of 79 AUMs (animal unit months). This 157 acres of rangeland would be out of production ten years with a maximum of 1,582 acres out of production in any one peak mining year. In total, the maximum annual loss would be 790 AUMs.

These losses would not significantly reduce regional agricultural production; however, individual operators could be severely impacted.

Ranching and farming are the primary uses of the land.

FACILITY ANALYSIS

The coal mined from the tract would probably be used in an electric power generating plant located near the mine.

Agriculture

Approximately 600 acres for the facility site would be taken out of agricultural production. In a worst-case analysis, annual agricultural production lost for the life of the facility would be 7,800 bushels of wheat (based on current land use).

A short-term disruption of 12 acres per mile would result during construction of an undetermined length of water pipeline. Roadways would disturb 14.5 acres per mile. A railroad spur would eliminate agriculture on 18 acres per mile for the entire life of the electric power plant.

Potential negative impacts to vegetation and to livestock exist downwind from coal conversion facilities due to nitrogen oxides, sulfur dioxides, and particulate matter (West-Central North Dakota Regional Environmental Impact Study on Energy Development, 1978). These impacts would be analyzed in detail by the state permitting authorities during their review of facility permit applications.

Water

Water requirements for an electric power facility are approximately 9,000 acre-feet per year. The likely source of this water would be Lake Sakakawea. Present regulations require state approval of disposal sites for facility wastes of ash, sludge, and water.

Recreation

Recreation facilities in the region (community camping and picnic areas, Lake Sakakawea, and Theodore Roosevelt National Memorial Park) are expected to satisfy the bulk of recreation demand from the projected increased population.

Wildlife

Wildlife impacts associated with the electric power plant could occur in two ways: 1) impacts from destruction of habitat and 2) impacts from the increase in human population. The removal of vegetation for a 600-acre electric power facility and the expansion of urban areas, highways, and railroads would prevent or reduce the use of an area by wildlife, regardless of the type of vegetation removed.

Powerlines, pipelines, and access roads could be constructed in key wildlife areas with partial or total destruction of habitat. Other anticipated impacts include eagle electrocution on powerlines, migratory bird deaths from striking powerlines close to wetlands, road kills along transportation routes through wildlife areas, harassment of wildlife by off-road vehicle use, and increased poaching. These impacts, along with habitat destruction, would result in decreased wildlife populations in the area. Wildlife oriented recreation such as hunting and observation would have to be sought elsewhere. Poaching and road kills have increased dramatically in areas of North Dakota, Montana, Wyoming, and Colorado where energy development has occurred. The problem is compounded where transportation corridors pass through wildlife areas and when employee shift changes coincide with wildlife feeding periods. This situation could occur in the tract area.

Aesthetics

The visual impact would be the penetration of the skyline by the facility, as seen from communities and major transportation corridors. The highly visible 600-foot stack could potentially be seen thirty or more miles away and would demand a response either positive or negative. During the expected 40-year life of the plant, its visual dominance could be perceived as a loss of amenity through impairment of the landscape.

Economic and Social

Construction and operation of the Werner facility would result in impacts to services in some area communities. Dunn Center, Killdeer, Halliday, and Dodge, North Dakota would experience increases in both population and employment as a result of development.

Peak employment during the construction phase of the facility is expected to occur in 1992 at 1,248 employees, with full operations employment expected in 1999 at 200 employees. The above communities would probably face inadequacies of one or more community services as direct results of the 1992 peak construction employment/population levels.

Population associated with full operation (1999 and beyond) of the facility is expected to cause water storage and distribution problems in Dunn Center as a direct result of facility development. Killdeer, Halliday, and Dodge would experience inadequacy of one or more community services by 1999 even without tract development. Development of the facility would add to the problems expected to occur.

Of the 35 persons interviewed in Dunn and Stark counties (in a BLM random sample survey), well over half supported a coal conversion facility or facilities in the area.

The concerns expressed in both counties tended to be quite diffuse, with only air quality getting minimally more attention from persons interviewed than other potential effects of such a facility. About one-fourth of the respondents in the two-county area oppose such facilities; this opposition emerges as more vigorous than support, which is often heavily qualified by interviewed persons.

Some persons in Dunn and Stark counties would clearly benefit economically from the construction and

operation of a coal conversion facility. These persons—retailers, persons with or capable of acquiring appropriate job skills, and persons outside the labor force—would be a position to take advantage of the expanded economic activity generated by the Werner plant.

Construction and operation of the Werner plant would result, particularly during the short term, in a changed community environment. The existing social environment is strongly endorsed by many area residents. Satisfaction of residence would likely decline in Dunn Center, Halliday, Killdeer, Manning, Dodge, and Dickinson during the construction phase of the Werner plant. During the operation phase, the projected population levels above baseline are not significant in either Dunn or Stark County, thus a return to a routine, predictable social environment can be expected.

Dickinson would receive the major population growth from the construction and operation of the plant. Dickinson and Stark County are in a fairly solid position to deal with such growth because of recent experience with industrialization, a fairly broad population base, and a diverse economic base. Nevertheless, there would be short-term stresses in Dickinson due to the construction of the plant. Traffic, noise, impersonalization, unsociable behavior, and similar consequences would likely be apparent during the construction phase. Social impacts caused by the plant would intensify changes that have been occurring in Dickinson due to oil and gas development. In the case of a power plant it is not likely that these changes would be evident beyond construction.

Burleigh and Morton counties would also receive a substantial number of residents if the Werner plant is built; however, the projected growth due to the plant would only be about one percent of the county populations as projected without development. No significant effects related to the plant would be expected in Burleigh and Morton counties.

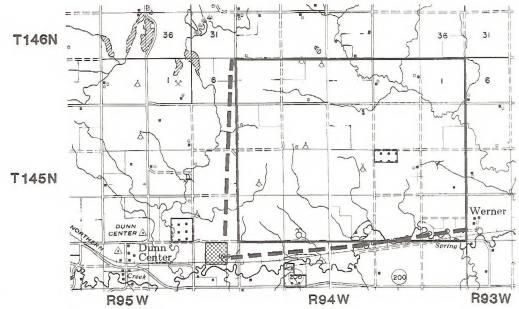
Dunn County and the communities of Dunn Center, Halliday, Killdeer, Manning, and Dodge would face the most substantial short-term impacts of plant construction. Dunn County has limited experience with industrialization, has a small population base, and is, economically and socially, relatively homogenous. The temporary population increases would cause problems for residents and administrators in Dunn County. Through the construction period of the project, the capacity of Dunn County communities to absorb growth and change would be stressed. Allocation of public resources (schools, medical care, law enforcement, and similar services) would be difficult. These problems would be short lived. Upon completion of construction, the plant would not generate high levels of employment or population effects. A return to a routine nonstressful environment would follow. The long-term implications of the Werner plant are minimal in each of the areas being considered (Dunn, Stark, and Burleigh-Morton counties). It would present short-term problems for some residents, but these problems would probably not persist beyond construction.

Air Quality

An air quality modeling analysis was undertaken. The projected air quality impacts were compared to applicable state and federal ambient air quality standards as well as state Prevention of Significant Deterioration (PSD) regulations.

This facility was shown to comply with all State and Federal Ambient Air Quality Standards. It was also found to be in compliance with all State PSD increments.

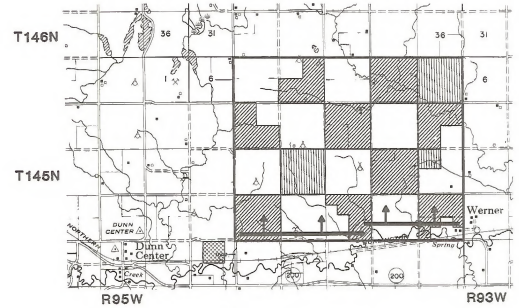
WERNER TRACT



SURFACE

LEGEND

- Private Surface
- Surface Owner Nonconsents
- Tract Boundary
- Federal Coal
- State Coal
- Private Coal



SUBSURFACE

- Surface Facilities
- Out-of-Pit Haul Roads
- Pit Advancement

1 0 1 2 3 4 5 6

Scale In Miles

WERNER
SITE-SPECIFIC SUMMARY MATRIX

COAL ECONOMICS

TRACT RANKING SUBFACTORS	PRESENT SITUATION	COMMENTS	INFORMATION SOURCE
Coal Quality	Lignite: 5,071 to 6,076 Btus/lb. Sulfur: 0.8% Average.		USGS
Coal Quantity	Total Recoverable - 297.3 million tons. State - 18.4 million tons. Federal 112.0 million tons.		USGS
Coal conservation and Maintenance of Production	90% recovery rate. New mine.		USGS
Energy Production	Net energy analysis. About 37.7 Btus to produce one lb. of coal.	Net energy analysis 1 Btu expended for 185 Btus produced.	BLM
Likelihood of Leasing and Development	One Expression of Leasing Interest specifically addressed the tract area.	End use would likely be for a power plant.	

IMPACTS TO THE NATURAL ENVIRONMENT

TRACT RANKING SUBFACTORS	PRESENT SITUATION	ANTICIPATED EFFECT OF LEASING DEVELOPMENT	SIGNIFICANCE OF ANTICIPATED IMPACT
Air Quality	Good	Increase in particulate concentration.	Insignificant
Minerals Other than Coal	High interest in oil and gas in the region - moderate interest in the tract. Ongoing exploration activity.	Delay of exploration and development of oil and gas Moderate potential for conflict.	Significant.
Water	Tract area aquifers feed Spring Creek.	Decrease in water quality to the point of violating state standards. Loss of irrigation use of Spring Creek.	Insignificant
Wildlife	Native prairie 36%, woodlands 17%, and wetlands 1.5% of tract.	Would be destroyed. Reclamation unsure. Adverse impacts from human population increase.	Significant on and around tract. Unknown on a regional basis.
Cultural Features	10% of tract inventoried. Significant Knife River flint quarries, habitation and open plains site recorded to date in southern portion of tract.	Potential loss of significant undiscovered sites. Loss of scientific knowledge.	Significant
Amenity Values	Agricultural character of high visual quality, but not valued as scenery. View of the tract is limited.	No significant views of the tract.	Insignificant

TRACT RANKING SUBFACTORS	PRESENT SITUATION	ANTICIPATED EFFECT OF LEASING/DEVELOPMENT	SIGNIFICANCE OF ANTICIPATED IMPACT
Special Management Areas/ Unique Resource Impacts	No wilderness, special management, or ACEC's in the area.	Elimination of options for future designation.	Insignificant
Other Land Use & Transportation	Agriculture, minor roads and utilities.	Displacement of existing agricultural use. Relocation of exsiting roads and utilities.	Insignificant
Reclamation Potential	8% of the area has been rated "poor" for reclamation.	Potential for unsuccessful reclamation on part of the tract. Higher costs for reclamation.	Insignificant
Unsuitability Criteria	Buffer zones deferred to mine plan. Federally listed endangered species, eagle nests, Bald and Golden eagle roosts and concentration areas, falcon nesting sites, migratory birds, floodplains, and state resident fish and wildlife need further study.	Not Applicable	Not Applicable
	SOCIAL AND ECONOMIC		
Economic Changes	Population and employment levels forecasted relatively stable through 2000 A.D. Regional income to increase moderately.	Dodge, Halliday, Dunn Center and Killdeer would experience population changes. Regional income would increase slightly.	Significant
Community Service Assessment	Dodge, Dunn Center and Halliday have one or more inadequate services. Resident perception of problem areas include: laws enforcement, roads, medical and day care.	Four or more services will become inadequate in Dodge, Dunn Center, and Halliday.	Significant
Public Attitudes	Generally support (conditionally) coal development.	Not Applicable	Not Applicable
Lifestyle and Social Structure	Most residents favor the uncrowded friendly environment.	Some deterioration of quality of life in Stark and Dunn counties.	Not Applicable
Agricultural Operations	There are 20 operators in the tract. There are 3,141 acres of cropped land and 3,164 AUMs.	Operators affected by long-term loss of production. Average annual loss of 87 acres (2,227 bu. of wheat) excluding 543 acres of summer fallow. Maximum loss/peak mining year= 861 acres (2,242 bu. of wheat).	Significant
Consistency with other Plans and Policies	BLM - Management Framework Plan of 1980.	Not Applicable	Not Applicable

DUNN CENTER

The Dunn Center tract is about 5 miles southeast of Dunn Center, North Dakota, in Dunn County. The land is used primarily for farming and ranching.

The tract contains about 23 percent (338.7 million tons) of the federal coal under current consideration in the Fort Union Region. Four economically recoverable seams of lignite coal underlie the tract. The seams average 16.5, 5.6, 8.3, and 3.6 feet in thickness. Overburden ranges from less than 150 feet to 200 feet in thickness.

The generic mining plan calls for a surface mine using draglines, electric shovels, bottom-dump coal haulers, scrapers, and other support equipment. An indirect liquefaction plant would likely utilize the mined coal.

The Nokota Company has proposed a coal methanol synfuel plant to be built to go into operation in the middle to late 1980s for the Dunn Center tract. Mercer County, bordering Dunn County on the east, is the center of coal development in North Dakota. The closest active mines are the Husky Industries and the Indianhead mines about 30 miles south and 30 miles east of Dunn Center respectively.

The tract is in the Williston Basin, where oil and gas exploration, discovery, and production are increasing.

Mining would take an average of 500 acres of agricultural land out of production annually.

SITE SPECIFIC ANALYSIS

Air Quality

An air quality modeling analysis was undertaken. The projected air quality impacts resulting from the mine operation were compared to applicable state and federal ambient air quality standards as well as state Prevention of Significant Deterioration (PSD) regulations.

A mine on the Dunn Center tract was shown to comply with the state ambient air quality standards and the Class II PSD annual standards; however, the 24-hour particulate standards (which cannot be exceeded more than once per year) could possibly be violated during times of strong winds and peak production.

Minerals

Because the tract is located in the Williston Basin, it has a potential for oil and gas development. A producing oil field ovelaps this tract. The Saxon field was discovered in 1980 and presently consists of one producing oil well. Coal mining and associated operations preclude or inhibit certain phases of oil and gas exploration. Coal mining could delay exploration activities for six to eight years or even for the entire life of the mine.

Wildlife

Mining would eliminate the unique unfarmed wildlife habitat on the tract. Some riparian wetlands, woodlands, and native prairie would be destroyed.

Cultural

Some information on cultural resource values in the area is available. The tract contains significant sites and/or artifacts from the Knife River flint quarries. Loss of these cultural resources (due to mining) can be considered significant, unless the important sites in the northern part of the tract would be found unsuitable for mining. The loss of identified values would be long-term and irreversible.

Reclamation

Some instability problems such as area-wide settling or localized subsidence could occur. The extent of the problems would depend on reclamation planning and operation. Over the long run, the original productivity level of the soils should return to the tract.

Economic and Social

Construction and operation of the mine would result in significant impacts upon services in some communities. Dickinson, Dodge, Dunn Center, Halliday, Killdeer, and Mandan would experience significant increases in both population and employment as the result of the development of the tract. Other communities in western North Dakota would also receive population increases; however, the increases in the smaller towns are so small (often less than one percent of the baseline population) that they would not significantly affect community service adequacy.

Peak employment during the construction phase of the mine is expected to occur in 1986 at 265 employees,

with full operations employment expected in 1992 at 450 employees. Dickinson, Dodge, Dunn Center, Halliday, and Killdeer would probably face inadequacies of one or more community services due to of the peak construction employment/population levels. As Mandan would have an inadequate level of social services by 1986 without tract development, additional population growth would simply worsen an inadequate service situation.

Full operation of the mine is also expected to result in serious impacts to area communities. Dickinson, Dodge, Dunn Center, Halliday, Killdeer, and Mandan would all have inadequacies of public services directly resulting from the population influx associated with mine operations.

The rural areas of Stark and Dunn County would also receive mining-related population influx (though at a much lower level than the communities). The population growth would result in additional demands on some of the services.

The populations of Bismarck-Mandan (Burleigh and Morton counties) and Williston (Williams County) would also grow due to constructing and operating the Dunn Center mine. Each of these communities is sufficiently large in population, however, that proportionally the population effects on social structure would be minimal. Increased population levels, minimally above the baseline in these cities, should not have any significant or noticeable effect on the social life in these areas.

In contrast, Dunn and Stark County communities would experience both construction and operations phase effects. Dunn Center, Killdeer, Halliday, Dodge, and Dickinson would receive a significant number of new residents because of the mine. During construction, Dickinson would receive the bulk of the population effects, but Dunn County communities would also be significantly affected. The pattern is very similar, in the long term, with Stark County attracting over 1,000 new residents, (above baseline) due to the mine.

Proportionally, the major effects would be in Dunn County, where the population base is much lower. The social effects of the Dunn Center mine would be noticeable in Stark County but would be more profound and systematic in Dunn County during both construction and operation of the mine. Roughly 250 new persons above baseline in Dunn County communities would, given the present social homogeneity, result in changes to political, religious, family, interaction, and organizational characteristics. The changes would likely be more observable during construction but would persist through the operations phase of the mine.

Since both Stark and Dunn County residents strongly endorse the social atmosphere of their respective communities, many of the changes brought by the mine would probably not be welcome. The negative effects would especially be noticed by Dunn County residents. A faster pace of life, heavier traffic, increased social segmentation, and the presence of a large number of newcomers who may not share the interests and values of existing residents—these changes and others would result in diminished satisfaction with the area for some residents. In Stark County these changes should not be as pronounced, because the city of Dickinson has been experiencing many social changes due to oil and gas development.

Agriculture

Mining the tract would require taking an average of 500 acres out of production each year.

An average of 125 acres of cropland, excluding summer fallow, would be removed from production each year, resulting in an annual loss of 3,200 bushels of wheat. This cropland would be out of production ten years with a maximum of 1,262 acres out of production in any one peak mining year. In total, the maximum annual loss would be 32,307 bushels of wheat.

Peak mining year disturbance of 1,000 acres of hayland would result in an annual loss of 1,300 tons of hay production from dryland acreage. Irrigated hayland would also be disturbed. Maximim disturbance during peak mining years would affect 53 acres and result in an annual loss of 265 tons of hay.

An average of 230 acres of rangeland would be removed from production each year, resulting in an average loss of 115 AUMs (animal unit months). This rangeland would be out of production ten years with a maximum of 2,349 acres out of production in any one peak mining year. In total, the maximum annual loss would be 1,174 AUMs.

These losses would not significantly reduce regional agricultural production; however, some individual operators would be severely impacted.

The land is used primarily for farming and ranching.

FACILITY ANALYSIS

The coal mined from the tract would probably be used in an indirect liquefaction plant located near the mine.

Agriculture

Approximately 960 acres for the facility site would be taken out of agricultural production. In a worst-case analysis, 12,500 bushels of wheat would be lost annually during the life of the facility (based on current land use).

A short-term disruption of 12 acres per mile would result during construction of an undetermined length of water pipeline. Roadways would disturb 14.5 acres per mile. A railroad spur would eliminate agriculture on 18 acres per mile for the entire life of the indirect liquefaction plant.

Potential negative impacts to vegetation and to livestock exist downwind from coal conversion facilities due to nitrogen oxides, sulfur dioxides, and particulate matter (West-Central North Dakota Regional Environmental Impact Study on Energy Development, 1978). These negative impacts would be analyzed in detail by the state permitting authorities during their review of facility permit applications.

Water

Water requirements for an indirect liquefaction plant are approximately 11,500 acre-feet per year. The likely source of this water would be Lake Sakakawea. Present regulations require state approval of disposal sites for facility wastes of ash, sludge, and water.

Recreation

Recreation facilities in the region (community camping and picnic areas, Lake Sakakawea, and Theodore Roosevelt National Memorial Park) are expected to satisfy the bulk of recreation demand from the projected increased population. The social attitude survey revealed a concern for existing recreation facilities. It was also stated that an increase in population might result in the upgrading of currently marginal recreation facilities.

Wildlife

Wildlife impacts associated with the indirect liquefaction plant could occur in two areas: 1) impacts from destruction of habitat and 2) impacts from the increase in human population. The removal of vegetation for a 960-acre indirect liquefaction facility and the expansion of urban areas, highways, and railroads would prevent or reduce the use of an area by wildlife, regardless of the type of vegetation removed.

Powerlines, pipelines, and access roads could be constructed in key wildlife areas with partial or total destruction of habitat. Other anticipated impacts include eagle electrocution on powerlines, migratory bird deaths from striking powerlines close to wetlands, road kills along transportation routes through wildlife areas, harassment of wildlife by off-road vehicle use, and increased poaching. These impacts, along with habitat destruction, would result in decreased wildlife populations in the area. Wildlife oriented recreation such as hunting and observation would have to be sought elsewhere. Poaching and road kills have increased dramatically in areas of North Dakota, Montana, Wyoming, and Colorado where energy development has occurred. The problem is compounded where transportation corridors pass through wildlife areas and when employee shift changes coincide with wildlife feeding periods. This situation could occur in the tract area.

Aesthetics

The visual impact would be the penetration of the skyline by the facility, as seen from communities and major transportation corridors. The highly visible 500-foot stack could potentially be seen thirty or more miles away and would demand a response either positive or negative. During the expected 40-year life of the plant, its visual dominance could be perceived as a loss of amenity through impairment of the landscape.

Economic and Social

Construction and operation of the facility would result in significant impacts upon services in communities within the area from population and employment increases as a result of development. Zap, Golden Valley, Beulah, Hazen, Mandan, Dunn Center, Killdeer, Halliday, Dodge, and Dickinson would all have significant increases in population and employment.

Peak employment during the construction phase of the facility is expected to occur in 1985 at 5,750 employees, with full operations employment expected in 1989 at 1,140 employees. By 1985, the above communities would experience an inadequate level of one or more community services as a direct result of the peak construction employment/population levels.

Full operation (1989 and beyond) of the facility is expected to cause public service problems in all of the above communities as a direct result of tract development. Golden Valley and Hazen would experience inadequacy of several community services by 1989 even without facility development. Development of the facility would add to the problems expected to occur.

Burleigh and Morton counties (Bismarck and Mandan) would experience some construction-phase effects of the Dunn Center facility, but the counties of Dunn, Mercer, and Stark would be most significantly affected.

Based on interviews, in a BLM random sample survey with fifty-two persons in this three-county area, it appears that roughly three-fourths of the residents support the construction of a facility or facilities in the area. Approximately one-fourth of these persons were opposed to such plants. The major concerns that emerged from these discussions were the protection of existing air quality and the local consequence of rapid population growth.

The consequences of construction and operation of the plant would be unevenly distributed among present and future residents. The very high level of economic activity and population change during the construction period would permit some residents to benefit directly financially from facility construction. Included are persons with industrial skills, persons who could acquire these skills, local merchants, and persons outside the labor force desiring entry. Large numbers of persons in Dunn, Mercer, and Stark counties, however, would not participate in this increased economic activity but yet would experience significant social changes in their community.

The major benefit of living in Dunn, Mercer, and Stark counties, according to many residents interviewed, is the small town, friendly atmosphere. Even in Dickinson, which has experienced significant growth due to oil development, many residents indicated that the aspect of community life most appreciated is the cohesion of the area. Construction and operation of the facility would result in a changed social environment from the present and from what would exist without such development. The communities would become more segmented, impersonal, unpredictable, and stressful. This would be particularly true during construction, but in Dunn County the changes would persist at a significant level through the operation phase as well. Residents' satisfaction with their communities would likely decline due to implementation of the proposal.

The population effects of the construction phase of the facility would be significant in Dunn, Mercer, and Stark Counties. Dunn Center, Halliday, Killdeer, Manning, Dodge, and Dickinson would be most radically affected. Facility construction would also result in population levels well above those that would be expected without development in Beulah and Hazen. Mercer and Stark counties, due to a broader economic base, somewhat larger population base, and past experience in dealing with rapid growth, are somewhat better prepared to deal with the changes than is Dunn County. Although the consequences in Stark and Mercer counties are generally limited to the construction phase, the social effects of a facility would exist in Dunn County through the life of the facility.

Dunn County and its small communities (Dunn Center, Halliday, Killdeer, Manning, and Dodge) are poorly prepared to manage the growth that would be attached to the facility. Dunn County is agricultural, has had limited experience with industrialization, has a small population base, and historically has experienced population losses over the last several decades. Construction of the Dunn Center facility would likely result in disorganized social conditions at a very significant level. During the operations phase, stability should re-emerge but the population changes associated with a plant are of such scale that the character of the small communities would likely be permanently changed.

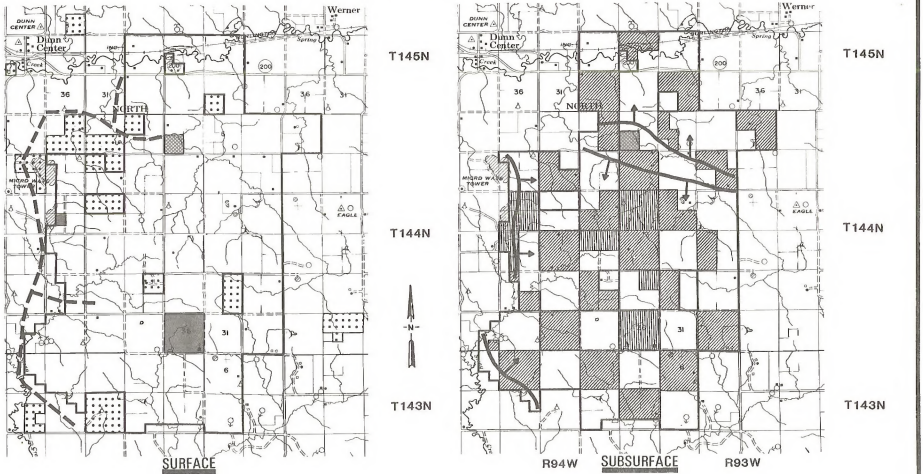
The benefits of such changes are fairly straightforward. The economic base would be broader and more dependable. Agricultural production and prices would be less important as sources of income and local economic activity. At the same time, industrialization would bring with it a more impersonal, segmented, stressful, and unpredictable social environment for all persons.

Air Quality

An air quality modeling analysis was undertaken. The projected air quality impacts were compared to applicable state and federal ambient air quality standards as well as state Prevention of Significant Deterioration (PSD) regulations.

This facility was shown to comply with all State and Federal Ambient Air Quality Standards. It was also found to be in compliance with all State PSD regulations.

DUNN CENTER S.E. TRACT



DUNN CENTER
SITE-SPECIFIC SUMMARY MATRIX

TRACT RANKING SUBFACTORS	PRESENT SITUATION	COMMENTS	INFORMATION SOURCE
Coal Quality	Lignite: 5,071 to 6,076 Btus/lb. Sulfur: 0.8% Average.	Samples from 23 core holes.	USGS
Coal Quantity	Total Recoverable - 833.7 million tons. State - 58 million tons. Federal 338.7 million tons.		USGS
Coal conservation and Maintenance of Production	90% recovery rate. New mine.		
Energy Production	Net energy analysis. About 37.7 Btus to produce one lb. of coal.	Net energy analysis 1 Btu expended for 152 Btus produced	BLM
Likelihood of Leasing and Development	Good. Two Expressions of Leasing Interest.	The Nokota Company has announced a coal-to-methanol facility.	

IMPACTS TO THE NATURAL ENVIRONMENT

TRACT RANKING SUBFACTORS	PRESENT SITUATION	ANTICIPATED EFFECT OF LEASING/DEVELOPMENT	SIGNIFICANCE OF ANTICIPATED IMPACT
Air Quality	Good	Could violate state and federal Ambient TSP Standards. Totally consumes the allowable Class II PSD increment for particulates.	Significant.
Minerals Other than Coal	Interest in oil and gas exploration and development is high. Tract overlaps an oil field (Sazon).	Delay of exploration and development until after reclamation. Excessive bypass of existing wells.	Significant.
Water	Unpotable on tract. Water draws to Spring Creek through shallow aquifers.	Further reduction of low water quality. Degradation of low flow water quality in Spring Creek and loss of use of irrigation.	Insignificant
Wildlife	Native prairie 69%, woodlands 19%, and wetlands 6% of tract.	Would be destroyed. Reclamation unsure. Adverse impacts from human population increase.	Significant on and around tract. Unknown on a regional basis.
Cultural Features	65% of tract inventoried. Northern portion of tract has cluster of important sites, such as Knife River flint quarries, habitation and open plain sites.	Potential loss of significant undiscovered sites. Loss of scientific knowledge.	Significant
Amenity Values	Agricultural character of high visual quality. Low scenic value. Visible from State Highway 200.	Short term loss of quality in views from Highway 200. In keeping with the character of the region.	Insignificant

TRACT RANKING SUBFACTORS	PRESENT SITUATION	ANTICIPATED EFFECT OF LEASING/DEVELOPMENT	SIGNIFICANCE OF ANTICIPATED IMPACT
Special Management Areas/ Unique Resource Impacts	No wilderness, special management, or ACEC's in the area.	Elimination of options for future designation.	Insignificant
Other Land Use & Transportation	Agriculture, minor roads and utilities.	Displacement of existing agricultural use. Relocation of exsiting roads and utilities.	Insignificant
Reclamation Potential	14% of the area has been rated "poor" for reclamation.	Probability of unsuccessful reclamation on part of the tract. Higher costs for reclamation.	Insignificant
Unsuitability Criteria	Buffer zones deferred to mine plan. Cultural, federally listed endangered species, eagle nests, Bald and Golden eagle roosts and concentration areas, falcon nesting sites, migratory birds and state resident fish and wildlife need further study.	Not Applicable	Not Applicable
	SOCIAL AND ECONOMIC		
Economic Changes	Population and employment levels forecasted relatively stable through 2000 A.D. Regional income to increase moderately.	Dickinson, Dunn Center, Halliday, Killdeer and Mandan would experience population changes. Regional income would increase slightly.	Significant
Community Service Assessment	Dickinson, Dunn Center, Dodge, Halliday, and Mandan have one or more inadequate services. Resident perception of problem areas include: law enforcement, recreation, retail, medical and day care.	Two or more services will become inadequate in Dickinson, Dunn Center, Dodge, Halliday, Killdeer, and Mandan.	Significant
Public Attitudes	Generally support (conditionally) coal development.	Not Applicable	Not Applicable
Lifestyle and Social Structure	Most residents favor the friendly, informal atmosphere.	Some deterioration of quality of life in Stark and Dunn counties.	Significant
Agricultural Operations	There are 49 operators in the tract. There are 3,673 acres of cropped land and 7,833 AUMs.	Operators affected by long-term loss of production. Average annual loss of 125 acres (3,200 bu. of wheat) excluding 2,598 acres of summer fallow. Maximum loss/peak mining year= 1,262 acres (32,307 bu. of wheat).	Significant
Consistency with other Plans and Policies	BLM - Management Framework Plan of 1980.	Not Applicable	Not Applicable

TRUAX

The Truax tract is about three miles north of Hazen, in Mercer County, North Dakota. The land is primarily used for farming and ranching.

The tract contains 2 percent (28.8 million tons) of the federal coal under current consideration in the Fort Union Region. The tract contains one economically recoverable seam of lignite coal. The seam averages 9.6 feet thick. Overburden ranges in thickness from less than 150 feet to 200 feet.

The generic mining plan calls for a surface mine using draglines, electric shovels, bottom-dump coal haulers, scrapers, and other support equipment. An on-site electrical generating plant would utilize the mined coal.

The tract contains three inactive mines. Nearby active mines are Knife River's Beulah mine (8 miles southwest), North American's Indianhead mine (14 miles southwest), and Consol's Glenharold mine, 15 miles east of the tract. Basin Electric Cooperative is constructing two 440-megawatt units for the Antelope Valley Generating Station (AVS) about eight miles west of the tract. The AVS project will be supplied by the proposed Coteau Properties mine to be developed adjacent to the generation station. The Coteau Properties mine is also expected to supply the proposed Great Plains Coal Gasification Project which is under construction adjacent to the AVS. Two electric generating stations are about fifteen miles east of the tract, adjacent to the Glenharold mine.

The tract is in the Williston Basin, where oil and gas exploration, discovery, and production are increasing. The tract contains no producing oil or gas wells.

Farming and ranching are the predominant uses of the land.

SITE SPECIFIC ANALYSIS

Air Quality

An air quality modeling analysis was undertaken. The projected air quality impacts resulting from the mine operation were compared to applicable state and federal ambient air quality standards as well as state Prevention of Significant Deterioration (PSD) regulations.

A mine on the Truax tract was shown to comply with the state ambient air quality standards and the Class II PSD annual standards; however, the 24-hour particulate standards (which cannot be exceeded more than once per year) could possibly be violated during times of strong winds and peak production.

Minerals

Because the tract is located in the Williston Basin, it has a potential for oil and gas development. Coal mining and associated operations preclude or inhibit certain phases of oil and gas exploration. Coal mining could delay exploration activities for six to eight years or even for the entire life of the mine.

Wildlife

Mining would eliminate the unique unfarmed wildlife habitat on the tract, such as wetlands, woodlands, and native prairie. Off-site aquatic habitats in the Missouri River and its tributaries and Lake Sakakawea would receive potential pollution.

Cultural

Information on cultural resource values in the area is scarce. The tract could contain significant archaeological or historical sites and/or artifacts. Loss of these cultural resources (due to mining) can be considered significant, unless more information is collected to indicate otherwise. Inventory being contracted now would raise the level of confidence that loss would or would not occur. The loss of identified values, if any exist, would be long-term and irreversible.

Reclamation

Some instability problems such as area-wide settling or localized subsidence could occur. The extent of these problems would depend on reclamation planning and operation.

Over the long run, the original agricultural productivity level should be restored to the tract.

Aesthetics

Short-term views of the mined area from the town of Hazen would represent a visual loss in area character to the residents. This mining would result in undesirable views from the mining stage through reclamation.

Impacts would be short-term; the land would resemble the existing landscape after reclamation.

Economic and Social

Construction and operation of the mine would result in significant impacts upon services in some communities within the area because of population growth associated with employment. Beulah, Stanton, and Center would experience significant increases in both population and employment. Several other communities in western North Dakota would also receive population increases. However, assessments by the Bureau, as well as city-county and regional planners, show that the increases are so small (often less than one percent of the baseline population) that they would not significantly affect community service adequacy.

Peak employment during the construction of the mine is expected to occur in 1986 at 195 employees, with full operations employment expected in 1990 at 265 employees. By 1986, Stanton and Center would experience an inadequate level of community services as a direct result of the peak construction/population levels. Community services in Beulah would not be significantly impacted during the peak construction period.

Full operation (1990 and beyond) of the Truax mine is also expected to result in serious impacts on area communities. Beulah and Stanton would have one or more public services that would be inadequate as a direct result of the population influx resulting from tract operation. Even without tract development, Center would experience an inadequate level of some community services by 1990. Tract-related population increases would worsen an inadequate service situation. The rural areas of Mercer and Oliver counties would also receive tract-related population influx (though at a much lower level than the communities).

Stark County and Dickinson would receive limited population effects due to opening and operating a Truax mine. The bulk of these effects would fall in Mercer and Oliver counties and the communities of Beulah, Stanton, Hazen, and Center. The Mercer-Oliver area communities are now fairly well diversified economically and socially due to coal mining nearby. In addition, their public officials should be familiar with growth management problems. This experience would be a definite asset in dealing with the results of population increases. Beulah and Hazen would receive the most significant social structure effects of population increases. Population of Beulah and Hazen would increase only about 3 percent more than baseline projections during the construction phase; however, this increase would be about 10 percent of the baseline. These are substantial increases. The effects should not be traumatic in terms of the ongoing social processes due to past and present mining in the area. Social instability would not likely result from opening and operating the Truax mine.

The Truax mine would result in some population increases in Mercer and Oliver counties. The increases are not exceptionally large however, and probably would not seriously jeopardize residents' perceptions of favorable area attributes. The changes that would occur in Mercer and Oliver counties would be added to those that have already happened. The mine and its population effects might produce some further reduction in area satisfaction among those residents who are already concerned about recent changes in the social environment of their communities. This would not be particularly pronounced however, as the communities have already experienced these types of changes.

Agriculture

The proposed action would progressively remove an average of 476 acres of the total tract from agricultural production each year.

By the end of the 50-year mine life, 23,813 acres of the tract would have been disturbed, and 160 additional acres would be used for mine facilities.

An average of 190 acres of cropland, excluding summer fallow, would be removed from production each year. This cropland would be out of production ten years, with a maximum of 1,884 acres out of production in any one peak mining year. The maximum loss would be 47,100 bushels of wheat annually.

Peak mining year disturbance of 361 acres of hayland would result in an annual loss of 487 tons of hay production.

An average of 181 acres of rangeland would be taken out of production each year, resulting in an average loss of 90 AUMs (animal unit months). This rangeland would be out of production ten years, with a maximum of 1,788 acres out of production in any one peak mining year. The maximum annual loss would amount to 894 AUMs.

Regionally, these losses would not significantly reduce agricultural production, but some individual operators would be severely impacted.

The mine would remove 181 acres of rangeland out of production each year.

FACILITY ANALYSIS

Agriculture

The coal mined from the tract would be used in an electric power generating plant located near the mine.

Approximately 600 acres for the facility site would be taken out of agricultural production. In a worst-case analysis, 8,100 bushels of wheat would be lost annually during the life of the electric power plant (based on current use). A short-term disruption of 12 acres per mile would result during construction of an undetermined length of water pipeline. Roadways would disturb 14.5 acres per mile. A railroad spur would eliminate agriculture on 18 acres per mile from the entire life of the facility.

Potential negative impacts to vegetation and to livestock exist downwind from coal conversion facilities due to nitrogen oxides, sulfur dioxide, and particulate matter (West-Central North Dakota Regional Environmental Impact Study on Energy Development, 1978). These negative impacts would be analyzed in detail by the state permitting authorities during their review of facility permit applications.

Water

Water requirements for an electric power plant are approximately 13,000 acre-feet per year. The probable source for this water would be Lake Sakakawea. Present regulations require state approval of disposal sites for facility wastes of ash, sludge, and water.

Recreation

Recreation facilities in the region (community camping and picnic areas, Lake Sakakawea, and Theodore Roosevelt National Memorial Park) probably would receive the bulk of recreation demand from the projected increased population. The social attitude survey revealed a concern for existing recreation facilities. It was also stated that an increase in population might result in the upgrading of already marginal recreation facilities.

Wildlife

Wildlife impacts associated with the electric power plant occur in two areas: 1) impacts from destruction of habitat and 2) impacts from the increase in human population. The removal of vegetation for a 600-acre electric power facility and the expansion of urban areas, highways, and railroads would prevent or reduce the use of an area by wildlife regardless of the type of vegetation removed. Wildlife inventories will not be completed until December 1981.

Powerlines, pipelines, and access roads could be constructed in key wildlife areas with partial or total destruction of habitat. Other anticipated impacts include eagle electrocution on powerlines, migratory bird deaths from striking powerlines close to wetlands, road kills along transportation routes through wildlife areas, harassment of wildlife by off-road vehicle use, and increased poaching. These impacts, along with habitat destruction, would result in decreased wildlife populations in the area. Wildlife oriented recreation such as hunting and observation would have to be sought elsewhere.

Poaching and road kills have increased dramatically in areas of North Dakota, Montana, Wyoming, and Colorado where energy development has occurred. The problem is compounded where transportation corridors pass through wildlife areas and when employee shift changes coincide with wildlife feeding periods. This situation could occur in the tract area.

Taking water from shallow bays in Lake Sakakawea could have significant adverse impacts. These areas are prime nursery and spawning areas for sport, commercial, and forage fish. Eggs and young fish could occasionally be removed from the bays with the water.

Aesthetics

The visual impact would be the penetration of the skyline by the facility, as seen from communities and major transportation corridors. The 600-foot stack could potentially be seen thirty or more miles away and would elicit a response either positive or negative. The dominance of the facility in the landscape could be perceived as a loss of amenity through impairment of the landscape for the 40 years of the expected life of the plant.

Economic and Social

Construction and operation of the facility would result in significant impacts upon services in some communities as a result of population growth associated with employment opportunities. Center, Golden Valley, and Stanton, North Dakota would experience increases in both population and employment.

Peak employment during the construction phase of the facility is expected to occur in 1992 at 1,248 employees, with full operations employment expected in 1999 at 200 employees. By 1992, the above communities would experience an inadequate level of one or more community services as a direct result of the peak construction employment/population levels.

Full operation of the facility (1999 and beyond) is not expected to cause services in any of the communities to become inadequate. Even without facility development, Center, Golden Valley, and Stanton would experience inadequacy of several community services by 1999. Development of the facility would add to the problems expected to occur.

It appears that a strong majority of residents in a BLM random sample interview in Mercer and Oliver counties support the construction and operation of additional facilities in the area. Twenty-two persons were interviewed by BLM representatives in Mercer and Oliver counties and well over two-thirds of these people expressed support. (In Oliver County, only six residents were interviewed so considerable caution should be used in interpreting these results.) Since Mercer and Oliver counties already have several power plants in operation, it appears that local residents have generally come to accept or endorse the siting of these facilities in the area.

Mercer and Oliver County residents would not share equally in the benefits and costs of a facility. Some persons would be unable or unwilling to participate in the expanded economic activity and employment opportunities, both direct and indirect, of such a plant. These persons would, however, have a changed community with which to deal on a day-to-day basis. Other persons (qualified or potentially qualified to acquire an energy-related job, local retailers, and persons outside the labor force desiring entry) would financially benefit from the construction of the facility. Thus, some residents would, in the future, resent the siting of the plant in their locality, while others would endorse it.

A facility would, at least during construction, have some effect on the ongoing social processes of Mercer and Oliver counties. The communities of Beulah, Hazen, Stanton, and Center would temporarily have a more complex social environment. Since the social environment is the most appreciated facet of life in these areas today, there would be some reduction in this aspect due to the Truax facility's construction.

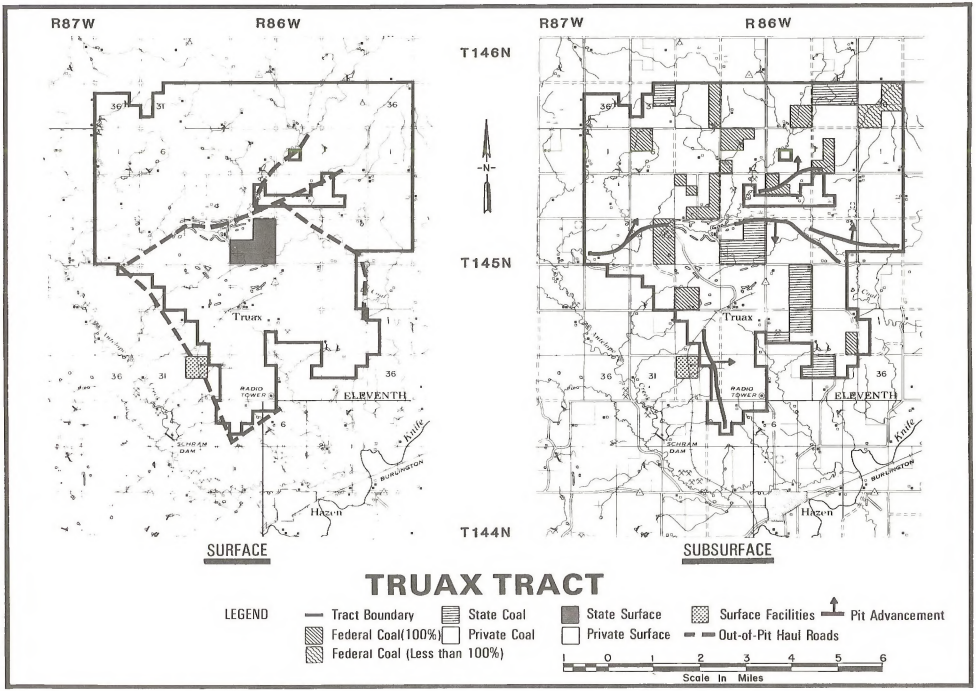
The Bismarck-Mandan area would receive much of the population growth from the proposed facility. These communities have fairly broad population bases at present. The most significant effects would be in Beulah, Hazen, Stanton, and Center. During the peak of the construction period, they would have roughly twenty percent more residents than would be expected without development. Both Mercer and Oliver counties have some measure of economic diversity (between agriculture and energy) and have experienced some coal development related growth. For these reasons, it is not expected that the facility would create unmanageable impacts either in the short-term or in the long-term. The levels of population change attached to the proposed plant area, outside of Bismarck and Mandan, are quite limited, particularly during the operations phase.

In a cumulative sense, the facility would be an additional source of community change in Mercer and Oliver counties. It would be in addition to other mines and facilities that have already been constructed. Due to the factors mentioned above, the facility would not result in widespread disruptions or disallocations of community resources. The social consequences would be almost entirely short-term.

Air Quality

An air quality modeling analysis was undertaken. The projected air quality impacts resulting from the facility's emissions were compared to applicable state and federal ambient air quality standards as well as state Prevention of Significant Deterioration (PSD) regulations.

This facility was shown to comply with all state and federal ambient air quality standards. It was also found to be in compliance with all state PSD increments.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Truax
ELEVENTH
RADIO TOWER
SCHRAM DAM
Knife
BURLINGTON
Hazen
SURFACE
SUBSURFACE
TRUAX TRACT
LEGEND
Tract Boundary
Federal Coal(100%)
Federal Coal (Less than 100%)
State Coal
Private Coal
State Surface
Private Surface
Surface Facilities
Pit Advancement
Out-of-Pit Haul Roads
0 1 2 3 4 5 6
Scale In Miles

TRUAX
SITE-SPECIFIC SUMMARY MATRIX

COAL ECONOMICS

TRACT RANKING SUBFACTORS	PRESENT SITUATION	COMMENTS	INFORMATION SOURCE
Coal Quality	Lignite: Average 6,919 Btus/lb. Sulfur: 0.8% Average.		USGS
Coal Quantity	Total Recoverable - 282.8 million tons. State - 23.6 million tons. Federal 28.8 million tons.		USGS
Coal conservation and Maintenance of Production	90% recovery rate. Prevent bypass of federal coal.		USGS
Energy Production	Net energy analysis. About 38 Btus to produce one lb. of coal.	Net energy analysis 1 Btu expended for 185 Btus produced	BLM/USGS
Likelihood of Leasing and Development	No specific Expressions of Leasing Interest.	The Truax tract could serve as an anternative leasing tract to the Antelope or Renner tract.	BLM

IMPACTS TO THE NATURAL ENVIRONMENT

TRACT RANKING SUBFACTORS	PRESENT SITUATION	ANTICIPATED EFFECT OF LEASING/DEVELOPMENT	SIGNIFICANCE OF ANTICIPATED IMPACT
Air Quality	Good	Totally consumes the allowable Class II PSD increment for particulates.	Significant
Minerals Other than Coal	High regional interest in oil and gas exploration and development. Low interest in area within tract.	Delay of exploration and development of soil and gas. Low probability of conflict.	Insignificant.
Water	Nonpotable water.	Disruption of livestock water in short term.	Insignificant
Wildlife	Native prairie 32%, woodlands 2%, and wetlands 6% of tract.	Would be destroyed. Reclamation unsure. Adverse impacts from human population increase.	Significant on and around tract. Unknown on a regional basis.
Cultural Features	No inventory on tract to date.	Potential loss of significant undiscovered sites. Loss of scientific knowledge.	Significant
Amenity Values	Agriculture, coal mining observed from State Highway 200 and town of Hazen.	Loss of visual amenity, acceptable appearance of coal mining because of prevalence in the region.	Significant
Special Management Areas/ Unique Resource Impacts	No wilderness, special management, or ACEC's in the area.	Elimination of options for future designation.	Insignificant

TRACT RANKING SUBFACTORS	PRESENT SITUATION	ANTICIPATED EFFECT OF LEASING/DEVELOPMENT	SIGNIFICANCE OF ANTICIPATED IMPACT
Other Land Use & Transportation	Agriculture, minor roads and utilities.	Displacement of existing agricultural use. Relocation of exsiting roads and utilities.	Insignificant
Reclamation Potential	6% of the area has been rated "poor" for reclamation.	Reclamation is potentially unsuccsessful in some areas - problems in revegetation. Higher reclamation cost.	Insignificant
Unsuitability Criteria	Buffer zones deferred to mine plan. Cultural, federally listed endangered species, eagle nests, Bald and Golden eagle roosts and concentration areas, falcon nesting sites, migratory birds and state resident fish and wildlife need further study.	Not Applicable	Not Applicable
	SOCIAL AND ECONOMIC		
Economic Changes	Population and employment levels forecasted relatively stable through 2000 A.D. Regional income to increase moderately.	Beulah, Stanton and Center would experience population changes. Regional income would increase slightly.	Significant
Community Service Assessment	Beulah, Stanton and Center have two or more inadequate services. Resident perception of problem areas include: law enforcement, recreation, retail and medical.	Beulah and Stanton would have at least two or more services become inadequate.	Significant
Public Attitudes	Generally support (conditionally) coal development.	Not Applicable	Not Applicable
Lifestyle and Social Structure	Most residents favor the uncrowded and aesthetic environment.	Some deterioration of quality of life in Mercer and Oliver counties.	Not applicable
Agricultural Operations	There are 56 operators in the tract. There are 908 acres of cropped land and 4,469 AUMs.	Operators affected by long-term loss of production. Average annual loss of 190 acres (4,750 bu. of wheat) excluding 3,652 acres of summer fallow. Maximum loss/peak mining year= 1,884 acres (47,100 bu. of wheat).	Significant
Consistency with other Plans and Policies	BLM - Management Framework Plan of 1980.	Not Applicable	Not Applicable

SAKAKAWEA

The Sakakawea tract is located in McLean County, North Dakota, about three miles west of the town of Garrison. The land is primarily used for farming and ranching.

The small business tract contains about one-tenth of one percent (2.2 million tons) of the federal coal under current consideration in the Fort Union Region. One economically recoverable seam of lignite coal underlies the tract. Its thickness averages 5.5 feet and it is beneath from 38 to 80 feet of overburden.

The generic mining plan calls for the mining company to mine in accordance with their individual needs. The surface mine would probably use draglines, electric shovels, bottom-dump coal haulers, scrapers, and other support equipment. The most probable use for the coal would be for local heating and spot market sales.

The nearest mine is Consolidation Coal Company's Glenharold mine located 22 miles to the south. The abandoned Custer strip mine is one mile east of the tract.

If the federal coal is not leased, it would probably be bypassed. The tract is located in the Williston Basin where oil and gas exploration, discovery, and production are increasing.

An average of 34 acres of the total tract per year would be removed from agricultural production.

SITE-SPECIFIC ANALYSIS

Minerals

Because the tract is in the Williston Basin, it has a potential for oil and gas development. Coal mining and associated operations preclude or inhibit certain phases of oil and gas exploration and development. Coal mining could delay exploration activities for six to eight years or even for the entire productive life of the mine.

Wildlife

Mining on the tract would eliminate the unique unfarmed wildlife habitat such as wetlands, native woodlands, and remnant interspersed native prairie.

Cultural

Information on cultural resource values in the area is scarce. The tract could contain significant archaeological or historical sites and/or artifacts. Loss of these resources (due to mining) can be considered significant, unless more information is collected to indicate otherwise. Inventory would raise the level of confidence that loss would or would not occur. The loss of identified values, if any exist, would be long-term and irreversible.

Aesthetics

The mine area is visible from State Highway 37. Mining activity would be visible and would create a short-term reversible impact.

Reclamation

Some instability problems such as area-wide settling or localized subsidence could occur. The extent of these problems would depend on reclamation planning and success. Over the long run, the original agricultural productivity level should return to the tract.

Economic and Social

Since the tract is a small business tract, work force requirements would be quite small. The U.S. Geological Survey estimated the construction work force at 50 and the full operations work force at 20.

A study of energy related construction workers in Mercer County between 1978 and 1980 by the Inter-Industry Technical Assistance Team (ITAT) found that an average of 62 percent of the energy project construction workers relocate to the job site area in response to employment opportunities. Assuming this to be the case with the Sakakawea coal tract, 31 of the 50 mine construction workers would relocate to the area in order to work at the mine. The other 19 workers would already be living within commuting distance of the coal tract.

The ITAT study also found that the average family size for the relocating construction workers was 1.63. Applying this figure to the 31 non-local workers would result in an area-wide population increase of 51 people. The ITAT study found that 62 percent of the construction workers relocating to this area resided in Beulah, the

closest town to the projects. The rest of the non-local workers resided primarily in other communities within Mercer County or in adjacent counties. Assuming this to be the case with the tract, 32 individuals would relocate in Garrison as a direct result of mine construction.

Mountain West Research forecasts population in Garrison to be 1,754 in 1985, the estimated start date of mine construction. The additional 32 individuals directly related to mine construction would result in a 2 percent population increase in Garrison. The mayor of Garrison has indicated that low levels of population growth such as this would have no impact on community services (McLean County Meeting, May 20, 1981).

Due to smaller employment requirements, population increases associated with mine operations would be smaller than those discussed with mine construction.

Agriculture

The proposed action would progressively remove an average of 34 acres of the total tract area per year from agricultural production.

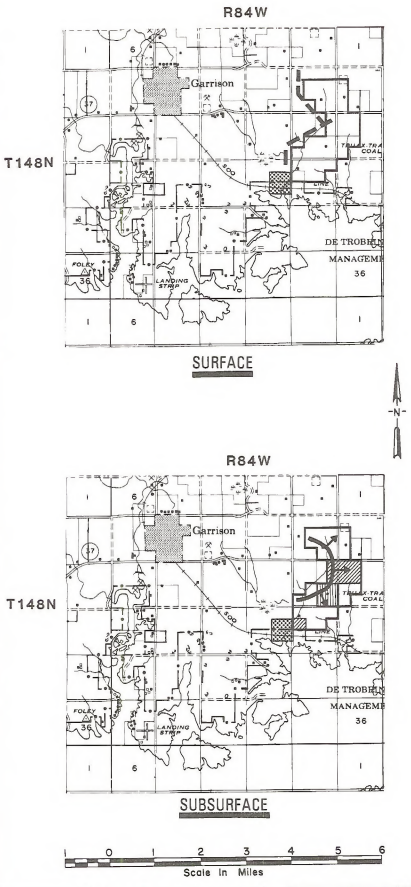
An average of 17 acres of cropland, excluding summer fallow, would be removed from production each year. This would be an average annual loss of 488 bushels of wheat. This cropland would be out of production ten years with a maximum of 169 acres out of production in any one peak year, resulting in a maximum loss of 4,850 bushels of wheat annually.

Peak mining year disturbance of 24 acres of hayland on operations with land over federal coal would result in an annual loss of 47 tons of hay production.

An average of 6 acres of rangeland would also be removed from production each year, resulting in an average loss of 4 AUMs (animal unit months). This rangeland would be out of production ten years with a maximum of 57 acres out of production in any one peak year, resulting in a maximum annual loss of 34 AUMs.

Regionally, these losses would not pose significant reductions in area agricultural production; however, individual operators could be severely impacted.

The most probable use for coal on this tract would be for local heating and spot market sales.



SAKAKAWEA TRACT

SAKAKAWEA
SITE-SPECIFIC SUMMARY MATRIX

COAL ECONOMICS

TRACT RANKING SUBFACTORS	PRESENT SITUATION	COMMENTS	INFORMATION SOURCE
Coal Quality	Lignite: Average 6,565 Btus/lb. Sulfur: 0.4% Average.		USGS
Coal Quantity	Total Recoverable - 8.4 million tons. State - 0.6 milion tons. Federal 2.2 million tons.		USGS
Coal conservation and Maintenance of Production	90% recovery rate. New mine.		USGS
Energy Production	Net energy analysis. About 37.7 Btus to produce one lb. of coal.	Net energy analysis 1 Btu expended for 174 Btus produced.	BLM/USGS
Likelihood of Leasing and Development	No Expression of Leasing Interest for tract area.	Small business tract.	BLM

IMPACTS TO THE NATURAL ENVIRONMENT

TRACT RANKING SUBFACTORS	PRESENT SITUATION	ANTICIPATED EFFECT OF LEASING/DEVELOPMENT	SIGNIFICANCE OF ANTICIPATED IMPACT
Air Quality	Good	Increase in particulate concentration.	Insignificant
Minerals Other than Coal	Some oil and gas potential. Some exploration has been conducted in the area.	Delay of exploration and activities.	Significant.
Water	Nonpotable.	Aquifer contamination. temporary loss of water for stock.	Insignificant
Wildlife	Native prairie, woodlands, and wetlands occupy 17% of tract.	Would be destroyed. Reclamation unsure. Adverse impacts from human population increase.	Significant on and around tract. Unknown on a regional basis.
Cultural Features	No inventory on tract to date.	Potential loss of significant undiscovered sites. Loss of scientific knowledge.	Significant
Amenity Values	High aesthetic quality; low scenic value.	Activity visible from Highway 37.	Significant
Special Management Areas/ Unique Resource Impacts	No wilderness, special management, or ACEC's in the area.	Elimination of options for future designation.	Insignificant
Other Land Use & Transportation	Agricultural.	Displacement of existing agricultural use. Relocation or bypass of utilities.	Insignificant

TRACT RANKING SUBFACTORS	PRESENT SITUATION	ANTICIPATED EFFECT OF LEASING/DEVELOPMENT	SIGNIFICANCE OF ANTICIPATED IMPACT
Reclamation Potential	20% of the area has been rated "poor" for reclamation.	Reclamation is potentially unsuccessful in some areas; presents problems in revegetation, therefore, higher costs.	Insignificant
Unsuitability Criteria	Buffer zones deferred to mine plan. Cultural, federally listed endangered species, eagle nests, Bald and Golden eagle roosts and concentration areas, falcon nesting sites, migratory birds and state resident fish and wildlife need further study.	Not Applicable	Not Applicable
	SOCIAL AND ECONOMIC		
Economic Changes	Population and employment levels forecasted relatively stable through 2000 A.D. Regional income to increase moderately.	Very small if any increase in population. Regional income to increase minimally.	Insignificant
Community Service Assessment	Most service adequate, offer with one or two inadequate services in local communities.	No change in adequacy.	Insignificant
Public Attitudes	Not Applicable.	Not Applicable	Not Applicable
Lifestyle and Social Structure	Not Applicable.	Not Applicable.	Not Applicable.
Agricultural Operations	There are 7 operators in the tract. There are 633 acres of cropped land and 137 AUMs.	Operators affected by long-term loss of production. Average annual loss of 17 acres (488 bu. of wheat) excluding 362 acres of summer fallow. Maximum loss/peak mining year= 169 acres (4,850 bu. of wheat).	Significant
Consistency with other Plans and Policies	BLM - Management Framework Plan of 1980.	Not Applicable	Not Applicable

GLENHAROLD

The Glenharold tract is in Mercer and Oliver counties, North Dakota, about two miles south of the town of Stanton. The land is primarily used for farming and ranching.

The tract contains about 3 percent (42.7 million tons) of the federal coal under current consideration in the Fort Union Region. Three economically recoverable seams of lignite coal underlie the tract. Their thicknesses average 11, 7, and 6 feet; overburden ranges 0 to 140 feet in thickness.

The generic mining plan calls for a surface mine using draglines, electric shovels, bottom-dump coal haulers, scrapers, and other support equipment. An electric generating plant would utilize the mined coal.

The Stanton and Leland Olds power plants are located just off this tract. The nearest active mines are Knife River's Beulah Mine, 18 miles southwest, North American's Indianhead Mine, 24 miles to the southwest, and Glenharold Mine on the tract. Should the tract not be considered for further leasing, about 3 percent (42.7 million tons) of the federal coal under consideration would probably be bypassed.

The tract is located in the Williston Basin, where petroleum exploration, discovery, and production are increasing.

An average of 174 acres of rangeland would be removed from production each year.

SITE SPECIFIC ANALYSIS

Air Quality

An air quality modeling analysis was undertaken. The projected air quality impacts resulting from the mine operation were compared to applicable state and federal ambient air quality standards as well as state Prevention of Significant Deterioration (PSD) regulations.

A mine on the Glenharold tract was shown to comply with the state ambient air quality standards and the Class II PSD annual standards; however, the 24-hour particulate standards (which cannot be exceeded more than once per year) could possibly be violated during times of strong winds and peak production.

Minerals

Because the tract is in the Williston Basin, it has a potential for oil and gas development. Coal mining and associated operations preclude or inhibit certain phases of oil and gas exploration and development. Coal mining could delay exploration activities for six to eight years or even for the entire productive life of the mine.

Wildlife

Mining would eliminate the unique unfarmed wildlife habitat of the Missouri River Breaks on the tract. Wetlands, native woodlands, and remnant interspersed native prairie would be destroyed.

Cultural

There is recorded information on cultural resource values in the area. The tract could contain significant archaeological or historical sites and/or artifacts. Loss of these resources (due to mining) can be considered significant unless more information is collected to indicate otherwise. The loss of identified values, if any exist, would be long-term and irreversible.

Reclamation

Some instability problems such as area-wide settling or localized subsidence could occur. The extent of these problems would depend on reclamation planning and achievement. Over the long run, the original productivity level of soil should return to the tract.

Economic and Social

Leasing the Glenharold tract would probably not change the area employment levels significantly. Without a change in mine employment, the population level of the surrounding communities would remain stable, and no new impacts to community services or changes in social conditions would result.

The only effect of leasing on community services would be to continue the existing level of demand for these services for an additional 40 years (life of the mine).

Agriculture

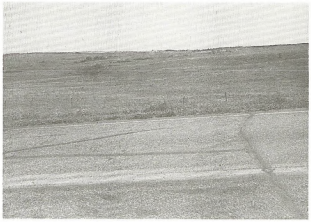
Mining the tract would require taking an average of 240 acres out of agricultural production each year.

An average of 33 acres of cropland, excluding summer fallow, would be removed from production each year, resulting in an average annual loss of 832 bushels of wheat. This cropland would be out of production ten years with a maximum of 334 acres out of production in any one peak mining year. The maximum annual loss would be about 8,417 bushels of wheat.

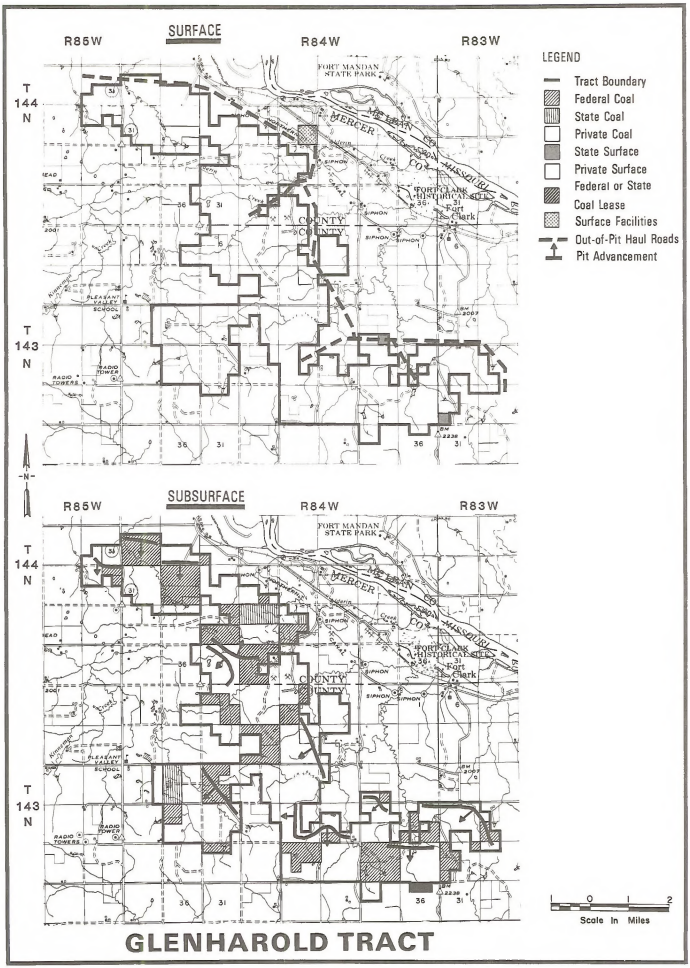
Peak mining year disturbance of 258 acres of hayland would result in an annual loss of 400 tons of hay production.

An average of 174 acres of rangeland would also be removed from production each year, resulting in an average loss of 87 AUMs (animal unit months). This rangeland would be out of production ten years with a maximum of 1,723 acres out of production in any one peak mining year. The maximum annual loss would be about 861 AUMs.

Regionally, these losses would not pose significant reductions in area agricultural production. Individual operators, however, could be severely impacted.



The Glenharold Mine, shown in center of picture, is on the tract.



GLENHAROLD TRACT

GLENHAROLD
SITE-SPECIFIC SUMMARY MATRIX

COAL ECONOMICS

TRACT RANKING SUBFACTORS	PRESENT SITUATION	COMMENTS	INFORMATION SOURCE
Coal Quality	Lignite: Averages 6,788 Btus/lb. Sulfur: 0.6% Average.		USGS
Coal Quantity	Total Recoverable - 198.9 million tons. State - 6.3 million tons. Federal Leased 24.8 million tons. Federal Unleased - 42.7 million tons.		USGS
Coal conservation and Maintenance of Production	90% recovery rate. Production maintenance.		USGS
Energy Production	Net energy analysis. About 37.7 Btus to produce one lb. of coal.	Net energy analysis 1 Btu expended for 180 Btus produced.	USGS/BLM
Likelihood of Leasing and Development	Good. Three expressions of leasing interest for parts of the tract.	The Glenharold mine is within the tract boundary.	BLM

IMPACTS TO THE NATURAL ENVIRONMENT

TRACT RANKING SUBFACTORS	PRESENT SITUATION	ANTICIPATED EFFECT OF LEASING DEVELOPMENT	SIGNIFICANCE OF ANTICIPATED IMPACT
Air Quality	Good	Possibly violate state and federal ambient TSP standards. Totally consumes the allowable Class II PSD increment for particulates.	Significant
Minerals Other than Coal	Interest in oil and gas exploration and development is high in the region but low for the tract.	Delay of exploration and development.	Insignificant
Water	Not potable. The area feeds an aquifer.	Temporary loss of stock watering during mining. Aquifer contamination.	Insignificant
Wildlife	Native prairie 42%, woodlands 12% and wetlands 3%.	Would destroy habitat. Reclamation unsure. Adverse impacts from human population increase.	Significant on and around tract. Unknown on a regional basis.
Cultural Features	45% of the tract inventoried to date. Important cultural resources recorded from tract. These represent activity from a long time range.	Potential distruction or disruption of undiscovered sites. Loss of scientific knowledge.	Significant
Amenity Values	Agriculture, coal mining areas. Low aesthetic and scenic values.	Coal mining is accepted in the region.	Insignificant

TRACT RANKING SUBFACTORS	PRESENT SITUATION	ANTICIPATED EFFECT OF LEASING/DEVELOPMENT	SIGNIFICANCE OF ANTICIPATED IMPACT
Special Management Areas/ Unique Resource Impacts	No wilderness, special management, or ACEC's in the area.	Elimination of options for designation in the future.	Insignificant
Other Land Use & Transportation	Agriculture, coal mining.	Displacement of agricultural use in short term. Relocation of roads and utilities.	Insignificant
Reclamation Potential	8% of the area has been rated "poor" for reclamation.	Reclamation may be unsuccessful in some areas. Presents difficulty in revegetation. Higher reclamation cost.	Insignificant
Unsuitability Criteria	Buffer zones deferred to mine plan. Cultural, federal and state listed endangered species, eagle nests, roost and concentration areas, falcon nesting sites, migratory birds, and state resident fish and wildlife need further study.	Not Applicable	Not Applicable
	SOCIAL AND ECONOMIC		
Economic Changes	Population and employment levels forecasted relatively stable through 2000 A.D. Regional income to increase moderately.	Very small, if any, increase in population. Regional income would increase slightly.	Insignificant
Community Service Assessment	Most services adequate, often with one or two inadequate services in local communities.	No change in adequacy.	Insignificant
Public Attitudes	Not Applicable.	Not Applicable	Not Applicable
Lifestyle and Social Structure	Not Applicable.	Not Applicable.	Not Applicable
Agricultural Operations	There are 26 operators in the tract. There are 1,759 acres of cropped land and 4,535 AUMs.	Operators affected by long-term loss of production. Average annual loss of 33 acres (832 bu. of wheat) excluding 225 acres of summer fallow. Maximum loss/peak mining year= 334 acres (8,417 bu. of wheat).	Significant
Consistency with other Plans and Policies	BLM - Management Framework Plan of 1980.	Not Applicable	Not Applicable

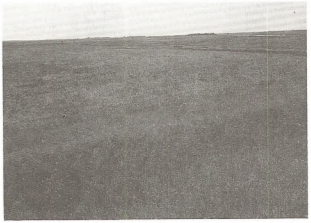
GARRISON

The Garrison tract is about three miles northwest of Garrison, North Dakota. The land is primarily used for farming and ranching.

The tract contains 17 percent (259.3 million tons) of the federal coal under current consideration in the Fort Union Region. The tract contains one economically recoverable seam of lignite coal. The seam averages 12 feet in thickness. Overburden ranges from less than 130 feet to 200 feet in thickness.

The generic mining plan calls for a surface mine using draglines, electric shovels, bottom-dump coal haulers, scrapers, and other support equipment. An electric generating plant would utilize the mined coal.

The tract includes one inactive mine. The nearest active mine is the Falkirk mine, about 22 miles southeast of the tract. The tract is in the Williston Basin, where oil and gas exploration, discovery, and production are increasing. The tract contains no producing oil or gas wells.



Mining the tract would take an average of 422 acres out of agricultural production annually.

SITE SPECIFIC ANALYSIS

Air Quality

An air quality modeling analysis was undertaken. The projected air quality impacts resulting from the mine operation were compared to applicable state and federal ambient air quality standards as well as state Prevention of Significant Deterioration (PSD) regulations.

A mine on the Garrison tract was shown to comply with the state ambient air quality standards and the Class II PSD annual standards; however, the 24-hour particulate standards (which cannot be exceeded more than once per year) could possibly be violated during times of strong winds and peak production.

Minerals

Because the tract is located in the Williston Basin, it has a potential for oil and gas development. Coal mining and associated operations preclude or inhibit certain phases of oil and gas exploration and development. Coal mining could delay exploration activities for six to eight years or even for the entire life of the mine.

Wildlife

Mining would eliminate the unique unfarmed wildlife habitat on the tract. Some wetlands, native woodlands, and remnant interspersed native prairie would be destroyed.

Cultural

Information on cultural resource values in the area is scarce. The tract could contain significant archaeological or historical sites and/or artifacts. Loss of these cultural resources (due to mining) can be considered significant, unless more information is collected to indicate otherwise. The loss of identified values, if any exist, would be long-term and irreversible.

Reclamation

Some instability problems such as area-wide settling or localized subsidence could occur. The extent of these problems would depend on reclamation planning and operation. Over the long run, the original productivity level of the soils should return to the tract.

Economic and Social

Construction and operation of the tract should not result in significant impacts to services in area communities. Peak employment during the construction phase of the Garrison tract is expected to occur in 1987 at 200 employees, with full operation employment expected in 1991 at 270 employees. Construction and operation workers would live in at least twelve different communities. Due to this dispersion, additional demands placed upon public services in any one community are expected to be minimal. Garrison, Underwood, and Washburn would probably receive the greatest population influx associated with tract development; however, they would not experience service inadequacies directly resulting from either peak construction or full operations employment/population levels.

During the peak construction and operation period of the Garrison mine, much of the new population would be located in both the Bismarck-Mandan area and in

Minot. Bismarck-Mandan and Minot, compared to other area communities, are quite large, diverse, and consequently capable of absorbing relatively large numbers of new residents. Population increases for both Bismarck-Mandan and Minot would range from one to two percent above baseline. These increases would not likely cause significant changes to social structures.

In McLean County, the construction phase would result in little population increase as compared to the baseline, but there would be significant increases during the operation phase. Only about 200 additional persons would be located in Underwood, Garrison, Washburn, and through the rest of McLean County during the construction phase of the mine. Roughly 400 additional persons would move in during the operation phase. Since social effects during the short-term construction period appear to be more disruptive than long-term operation effects, it does not appear that operating the mine would have significant effects on the social structures of communities in McLean County.

The institutional and organizational characteristics of these communities would not likely be significantly affected during the construction or operation phases. McLean County is already fairly diverse economically and socially and has experienced coal development recently. Underwood and Washburn have already undergone some changes due to this development. Garrison would be facing significant change due to coal development for the first time, but the projected population increases there would be quite low for both the construction and operation phases.

Population increases due to coal development would adversely affect the perceived quality of life in McLean County. These changes would not likely be traumatic, but they would be noticeable to many residents. The additional population would mean some alteration in the social environment, as well as the future environment (without the mine). There would likely be more pressure on outdoor recreational opportunities, which might reduce the satisfaction of some persons who presently enjoy these activities.

Agriculture

Mining the tract would require taking an average of 422 acres out of agricultural production each year.

An average of 160 acres of cropland, excluding summer fallow, would be removed from production each year, resulting in an average annual loss of 4,592 bushels of wheat. This cropland would be out of production ten years, with a maximum of 1,607 acres out of production in any one peak mining year. In total, the maximum annual loss would be approximately 46,120 bushels of wheat.

Peak mining year disturbance of 385 acres of hayland would result in an annual loss of 751 tons of hay production.

An average of 118 acres of rangeland would also be removed from production each year, resulting in an average loss of 71 AUMs (animal unit months). This rangeland would be out of production ten years, with a maximum of 1,175 acres out of production in any one peak mining year. In total, the maximum annual loss would be 705 AUMs.

These losses would not significantly reduce regional agricultural production, but some individual operators would be severely impacted.

The land is used primarily for ranching and farming.

FACILITY ANALYSIS

The coal mined from the tract probably would be used in an electric power generating plant located near the mine.

Agriculture

Approximately 600 acres for the facility site would be taken out of agricultural production. In a worst-case analysis, 8,400 bushels of wheat would be lost annually during the life of the electric power plant (based on current land use).

A short-term disruption of 12 acres per mile would result during construction of an undetermined length of water pipeline. Roadways would disturb 14.5 acres per mile. A railroad spur would eliminate agriculture on 18 acres per mile for the entire life of the facility.

Potential negative impacts to vegetation and to livestock exist downwind from coal conversion facilities due to nitrogen oxides, sulfur dioxide, and particulate matter (West-Central North Dakota Regional Environmental Impact Study on Energy Development, 1978). These negative impacts would be analyzed in detail by the state permitting authorities during their review of facility permit applications.

Water

Water requirements for an electric power facility are approximately 13,000 acre-feet per year. The probable source for this water would be Lake Sakakawea. Present regulations require state approval of disposal sites for facility wastes of ash, sludge, and water.

Recreation

Recreation facilities in the region (community camping and picnic areas, Lake Sakakawea, and Theodore Roosevelt National Memorial Park) probably would receive the bulk of recreation demand from the projected increased population.

Wildlife

Wildlife impacts associated with the electric power plant occur in two areas: 1) impacts from destruction of habitat and 2) impacts from the increase in human population. The removal of vegetation for a 600-acre electric power facility and the expansion of urban areas, highways, and railroads would prevent or reduce the use of an area by wildlife regardless of the type of vegetation removed.

Powerlines, pipelines, and access roads could be constructed in key wildlife areas with partial or total destruction of habitat. Other anticipated impacts include eagle electrocution on powerlines, migratory bird deaths from striking powerlines close to wetlands, road kills along transportation routes through wildlife areas, harassment of wildlife by off-road vehicle use, and increased poaching. These impacts, along with habitat destruction, would result in decreased wildlife populations in the area. Wildlife oriented recreation such as hunting and observation would have to be sought elsewhere.

Poaching and road kills have increased dramatically in areas of North Dakota, Montana, Wyoming, and Colorado where energy development has occurred. The problem is compounded where transportation corridors pass through wildlife areas and when employee shift changes coincide with wildlife feeding periods. This situation could occur in the tract area.

Taking water from shallow bays in Lake Sakakawea could have significant adverse impacts. These areas are prime nursery and spawning areas for sport, commercial, and forage fish. Eggs and young fish could occasionally be removed from the bays along with the water.

Aesthetics

The visual impact would be the penetration of the skyline by the facility, as seen from communities and major transportation corridors. The 600-foot stack could potentially be seen thirty or more miles away and would elicit a response either positive or negative. During the expected 40-year life of the plant, its visual dominance could be perceived as a loss of amenity through impairment of the landscape.

Economic and Social

Construction and operation of the electric power plant would result in impacts upon services in some communities. Garrison and Washburn would experience increases in both population and employment as a result of development.

Peak employment during the construction phase is expected to occur in 1992 at 1,248 employees, with full operations employment expected in 1999 at 200 employees. By 1992, Garrison and Washburn would probably experience inadequate levels of one or more community services as a direct result of construction employment/population levels.

Full operation of the facility (1999 and beyond) is not expected to result directly in impacts to community services; however, Garrison's planning and administrative services would be inadequate by 1999 even without development of the power plant.

Most of the social effects of the construction and operation phases would be felt in McLean, Burleigh, and Morton counties. Results of the BLM random sample interviews from McLean County indicate that about two-thirds of the twenty-five persons interviewed support the construction and operation of a coal conversion facility or facilities in the area. Since there are already power plants sited locally, this evidence, though weak, suggests that residents are not particularly concerned about them at this time.

In terms of absolute population effects, the Bismarck-Mandan area would receive the bulk of effects should the facility be constructed; however, the populations of these cities are projected to be only two percent above baseline population levels during peak construction and relatively lower during operations. The populations of Garrison, Underwood, and Washburn would increase during peak construction from ten to twenty percent above baseline. In these communities, some residents would financially benefit from such a facility, due to past industrial job experience, potential for acquiring industrial skills, and opportunity to take advantage of increased economic activity. Others in the area would be less capable or less interested in taking advantage of such activity.

During the construction phase, area residents would face a slightly altered community atmosphere due to the facility. Once the operations phase begins, the population effects and subsequent social effects of the Garrison facility would fall almost unnoticeably on Bismarck and Mandan.

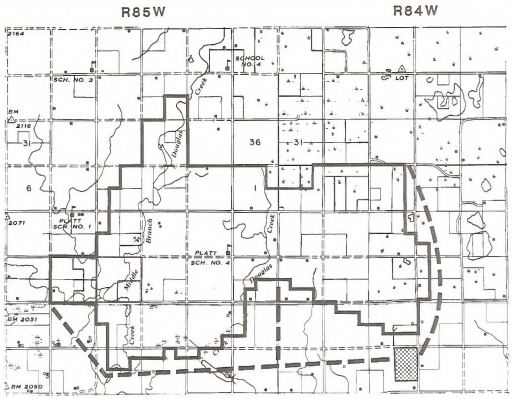
Information from McLean County resident interviews reveals that the natural and social environment of the area is widely appreciated by many residents. The social consequences of construction and operation of the facility would occur in McLean County almost entirely during the construction phase. Growth levels of this magnitude are not expected to affect residents' satisfaction with their community to any noticeable extent, except perhaps during peak construction.

Burleigh, Morton, and McLean counties are in a positive position to absorb the population effects of the facility. Bismarck and Mandan are quite large and diversified. The population effects of the facility, during both the construction and the operation phases, would not have significant effects on either of these cities. In McLean County, the population effects would be limited, particularly during the short-term. McLean County has had some administrative experience with industrialization and is fairly diverse economically as compared to other counties. It is not expected that construction or operation of the facility would have significant effects on the social life of the affected communities. The institutional (religious, leisure, occupational, and political) makeup of these areas would not be affected to any great extent by construction of the plant.

Air Quality

An air quality modeling analysis was undertaken. The projected air quality impacts resulting from the plant operation were compared to applicable state and federal ambient air quality standards as well as state Prevention of Significant Deterioration (PSD) regulations.

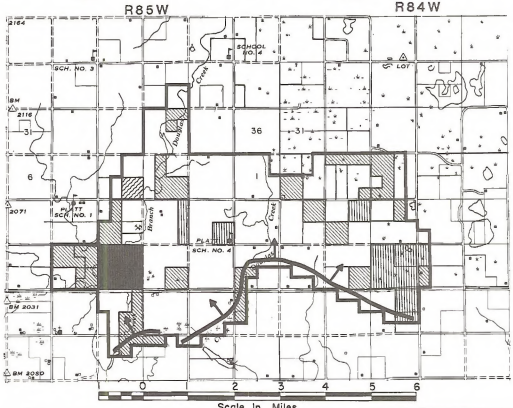
This facility was shown to comply with all state and federal ambient air quality standards. It was also found to be in compliance with all state PSD increments.



GARRISON TRACT

LEGEND

- Tract Boundary
- Federal Coal (100%)
- Federal Coal (Less than 100%)
- State Coal
- Private Coal
- State Surface
- Private Surface
- Surface Facilities
- Out-of-Pit Haul Roads
- Pit Advancement



GARRISON
SITE-SPECIFIC SUMMARY MATRIX

COAL ECONOMICS

TRACT RANKING SUBFACTORS	PRESENT SITUATION	COMMENTS	INFORMATION SOURCE
Coal Quality	Lignite: 5,777 to 7,040 Average 6,425 Btus/lb. Sulfur: 0.4%.		USGS
Coal Quantity	Total Recoverable - 259.3 million tons. State - 22.2 million tons. Federal 44.9 million tons.		USGS
Coal conservation and Maintenance of Production	90% recovery rate. New mine.		USGS
Energy Production	Net energy analysis. About 38 Btus to produce one lb. of coal.	Net energy analysis 1 Btu expended for 170 Btus produced.	BLM/USGS
Likelihood of Leasing and Development	One specific Expression of Leasing Interest.	Possible end use would be a power plant.	BLM

IMPACTS TO THE NATURAL ENVIRONMENT

TRACT RANKING SUBFACTORS	PRESENT SITUATION	ANTICIPATED EFFECT OF LEASING/DEVELOPMENT	SIGNIFICANCE OF ANTICIPATED IMPACT
Air Quality	Good	Totally consumes the allowable Class II PSD 24-hour increment for particulates.	Significant
Minerals Other than Coal	Interest in oil and gas exploration regionally and locally.	Conflict between oil and gas exploration and coal mining.	Significant.
Water	Aquifer (lignite) on tract. Non potable.	Short-term loss of stock water. Deterioration of groundwater quality.	Insignificant
Wildlife	Native prairie 58%, woodlands 10%, and wetlands 29% of tract.	Destruction of many potholes. Important on a regional, national and international basis. Reclamation unsure.	Significant.
Cultural Features	No inventory on tract to date.	Potential destruction or degradation of important sites. Loss of scientific knowledge.	Significant
Amenity Values	Agricultural character. Coal mining common in the region. High visual quality, low scenic value.	Change in the character of the tract. Accepted as fitting character of the region.	Insignificant
Special Management Areas/ Unique Resource Impacts	No wilderness, special management, or ACEC's in the area.	Elimination of options for future designation.	Insignificant

TRACT RANKING SUBFACTORS	PRESENT SITUATION	ANTICIPATED EFFECT OF LEASING/DEVELOPMENT	SIGNIFICANCE OF ANTICIPATED IMPACT
Other Land Use & Transportation	Agricultural.	Agricultural use displaced. Utilities and roads relocated. Permanent displacement of agriculture due to growth of communities.	Insignificant Insignificant
Reclamation Potential	7% of the area has been rated "poor" for reclamation.	Reclamation would be difficult on 7% of the area and potentially unsuccessful. Problems in revegetation.	Insignificant
Unsuitability Criteria			
	SOCIAL AND ECONOMIC		
Economic Changes	Population and employment levels forecasted relatively stable through 2000 A.D. Regional income to increase moderately.	Underwood, Washburn, and Garrison would experience population changes. Regional income to increase minimally.	Significant
Community Service Assessment	Garrison has two inadequate services. Resident perception of problem areas include: medical, road, and retail services.	No increase in service adequacy in Garrison, Underwood, and Washburn.	Insignificant
Public Attitudes	Generally support (conditionally) coal development.	Not Applicable	Not Applicable
Lifestyle and Social Structure	Most residents favor the informal atmosphere, hunting and fishing, and area aesthetics.	Some slight deterioration of quality of life in McLean County.	Not Applicable.
Agricultural Operations	There are 37 operators in the tract. There are 5,804 acres of cropped land and 2,819 AUMs.	Operators affected by long-term loss of production. Average annual loss of 160 acres (4,592 bu. of wheat) excluding 4,204 acres of summer fallow. Maximum loss/peak mining year= 1,607acres (46,120 bu. of wheat).	Significant
Consistency with other Plans and Policies	BLM - Management Framework Plan of 1980.	Not Applicable	Not Applicable

CENTER

The Center tract surrounds the town of Center, in Oliver County, North Dakota. The land is primarily used for farming and ranching.

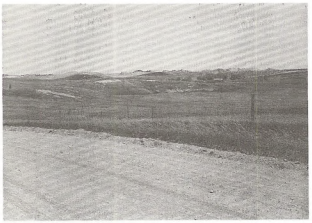
The tract contains about 1 percent (19.1 million tons) of the federal coal under current consideration in the Fort Union Region. Two economically recoverable seams of lignite coal underlie the tract. They average 11 and 7 feet in thickness. Overburden ranges up to 200 feet in thickness.

The amount of federal coal in the tract is minimal, and the individual parcels are scattered. Any mine on this tract could probably operate without mining the federal coal. The process would be relatively inefficient, and the unmined federal coal probably would be permanently bypassed.

The generic mining plan calls for a surface mine using draglines, electric shovels, bottom-dump coal haulers, scrapers, and other support equipment. The coal would probably be burned for electric power generation at either the Milton Young or Square Butte power plant.

One active mine is in the Center tract (Baukal-Noonan's Center mine). It would be the most likely customer for the coal. Nearby active mines are Knife River's Beulah mine (25 miles northwest), North American's Indianhead mine (31 miles northwest), and Consol's Glenharold mine (14 miles north).

The tract is in the Williston Basin, where oil and gas exploration, discovery, and production are increasing.



The tract contains an active coal mine shown above.

SITE SPECIFIC ANALYSIS

Air Quality

An air quality modeling analysis was undertaken. The projected air quality impacts resulting from the mine operation were compared to applicable state and federal ambient air quality standards as well as state Prevention of Significant Deterioration (PSD) regulations.

A mine in the Center tract was shown to comply with the state ambient air quality standards and the Class II PSD annual standards; however, the 24-hour particulate standards (which cannot be exceeded more than once per year) could possibly be violated during times of strong winds and peak production.

Minerals

Because the tract is located in the Williston Basin, it has a potential for oil and gas development. Coal mining and associated operations preclude or inhibit certain phases of oil and gas exploration and development. Coal mining could delay exploration activities for six to eight years or even for the entire life of the mine.

Wildlife

Mining would eliminate the unique unfarmed wildlife habitat on the tract. Some wetlands, native woodlands, and remnant interspersed native prairie would be destroyed.

Cultural

About 70 percent of the Center tract has been inventoried for cultural resources. Habitation sites, bison kill areas, and lithic artifacts have been indentified. They are fairly typical of archaeological finds in the area. Additional undiscovered cultural resources may also be present. Their loss would be an irreversible impact.

Aesthetics

Expansion of the mine would alter areas visible from Center and from State Highways 25 and 48. The principal impact would be the reduction of a natural view from the town of Center.

Reclamation

Some instability problems such as area-wide settling or localized subsidence could occur. The extent of these problems would depend on reclamation planning and operation. Over the long run, the original productivity level of the soils should return to the tract.

Economic and Social

The employment level of the mine would not change significantly if the tract were to be leased. The population level of the surrounding communities therefore would remain stable, and no additional impacts to community services or changes in social conditions would result.

Instead, leasing would require continuation of the existing level of community services for an additional 40 years (life of the mine).

Agriculture

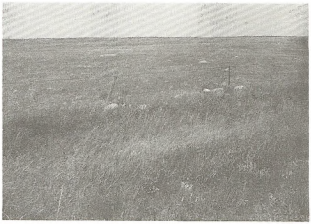
The proposed action would progressively remove an average of 183 acres of the total tract area per year from its current agricultural production.

An average of 46 acres of cropland, excluding summer fallow, would be removed from production each year, assuming an annual disturbance of 183 acres. This would be an average annual loss of 1,168 bushels of wheat. This cropland would be out of production ten years with a maximum of 456 acres out of production in any one peak mining year, resulting in a maximum loss of 11,582 bushels of wheat annually.

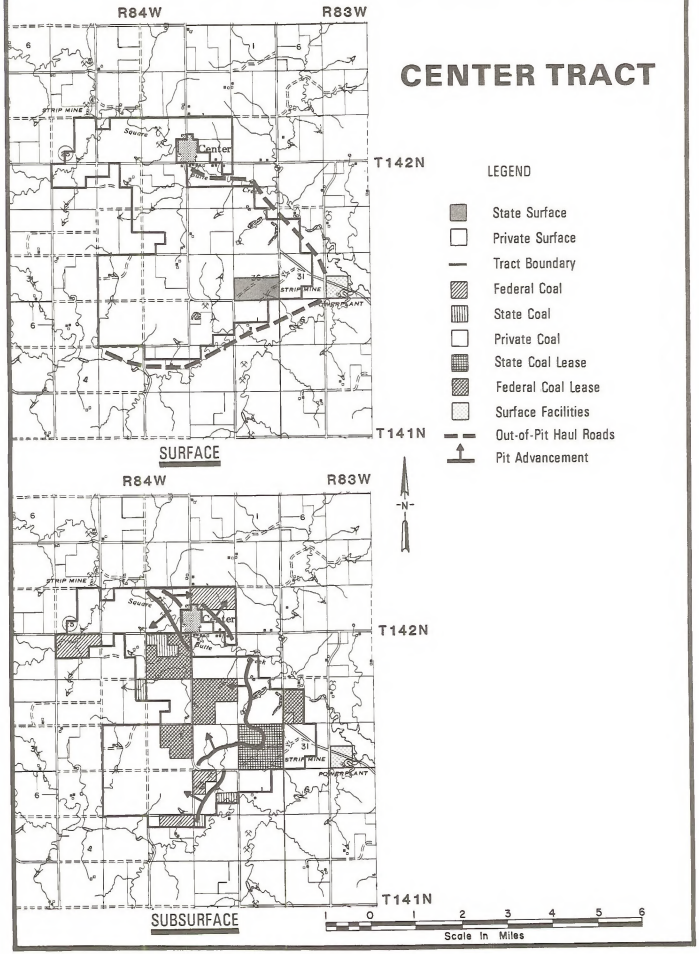
Peak mining year disturbance of 193 acres of hayland would result in an annual loss of 338 tons of hay production.

An average of 106 acres of rangeland would also be removed from production each year, resulting in an average loss of 53 AUMs (animal unit months). This rangeland would be out of production ten years with a maximum of 1,047 acres out of production in any one peak mining year, resulting in a maximum annual loss of 524 AUMs.

Regionally, these losses would not pose significant reductions in area agricultural production. The losses would be very significant to the six operators involved.



The tract has gently rolling terrain.


CENTER TRACT
R84W
R83W
T142N
T141N
Center
STRIP MINE
STRIP MINE
POWER PLANT
LEGEND
State Surface
Private Surface
Tract Boundary
Federal Coal
State Coal
Private Coal
State Coal Lease
Federal Coal Lease
Surface Facilities
Out-of-Pit Haul Roads
Pit Advancement
-N-
SURFACE
SUBSURFACE
0 1 2 3 4 5 6
Scale In Miles

CENTER
SITE-SPECIFIC SUMMARY MATRIX

COAL ECONOMICS

TRACT RANKING SUBFACTORS	PRESENT SITUATION	COMMENTS	INFORMATION SOURCE
Coal Quality	Lignite: 6,300 to 7,143 Btus/lb. Average: 6,747 Btus Sulfur: 1% Average.		USGS
Coal Quantity	Total Recoverable - 211.4 million tons. State - 27.1 milion tons. Federal Leased 30.9 million tons. Federal Unleased - 19.1 million tons.		USGS
Coal conservation and Maintenance of Production	90% recovery rate. Production maintenance.		USGS
Energy Production	Net energy analysis. About 38 Btus to produce one lb. of coal.	Net energy analysis 1 Btu expended for 179 Btus produced.	USGS/BLM
Likelihood of Leasing and Development	Five expressions of leasing interest were received for the Center Stanton Coal Deposit.	The Center mine is within the tract.	BLM

IMPACTS TO THE NATURAL ENVIRONMENT

TRACT RANKING SUBFACTORS	PRESENT SITUATION	ANTICIPATED EFFECT OF LEASING DEVELOPMENT	SIGNIFICANCE OF ANTICIPATED IMPACT
Air Quality	Good	Totally consumes the allowable Class II PSD increment for particulates.	Significant
Minerals Other than Coal	High interest in oil and gas in the region, moderate interest and ongoing exploration near tract.	Delay of exploration and development. Where actually mining . Moderate potential for conflict.	Significant
Water	Unpotable. Shallow water.	Groundwater deterioration on the tract.	Insignificant
Wildlife	Native prairie 34%, woodlands 2% and wetlands 3%.	Would destroy habitat. Reclamation unsure. Adverse impacts from human population increase.	Significant on and around tract. Unkno on a regional basis
Cultural Features	69% of the tract inventoried. Sites recorded to date have not affected coal mining.	Potential loss of significant undiscovered sites. Loss of scientific knowledge.	Significant
Amenity Values	Agriculture, mining. Moderate to low aesthetic and low scenic values. Visible from Center.	Loss of amenity where active mining is visible, especially from Center.	Significant
Special Management Areas/ Unique Resource Impacts	No wilderness, special management, or ACEC's in the area.	Elimination of options for designation in the future	Insignificant

TRACT RANKING SUBFACTORS	PRESENT SITUATION	ANTICIPATED EFFECT OF LEASING/DEVELOPMENT	SIGNIFICANCE OF ANTICIPATED IMPACT
Other Land Use & Transportation	Agriculture and mining, highways, utilities, a cemetary, abandoned mines.	Displacement of existing use. Relocation of some uses including roads and utilities.	Insignificant
Reclamation Potential	13% of the area has been rated "poor" for reclamation.	Reclamation may be unsuccessful in some areas. Higher reclamation cost.	Insignificant
Unsuitability Criteria	Buffer zones deferred to mine plan. Cultural, federal and state listed endangered species, eagle nests, roost and concentration areas, falcon nesting sites, migratory birds, and state resident fish and wildlife need further study.	Not Applicable	Not Applicable
	ECONOMIC AND SOCIAL		
Economic Changes	Population and employment levels forecasted relatively stable through 2000 A.D. Regional income to increase moderately.	Very small, if any, increase in population. Regional income would increase slightly.	Significant
Community Service Assessment	Most services adequate, often with one or two inadequate services in local communities.	No change in adequacy.	Significant
Public Attitudes	Not Applicable.	Not Applicable	Not Applicable
Lifestyle and Social Structure	Not Applicable.	Not Applicable.	Not Applicable
Agricultural Operations	There are 6 operators in the tract. There are 773 acres of cropped land and 888 AUMs.	Operators affected by long-term loss of production. Average annual loss of 46 acres (1,168 bu. of wheat) excluding 168 acres of summer fallow. Maximum loss/peak mining year= 456 acres (11,582 bu. of wheat).	Significant
Consistency with other Plans and Policies	BLM - Management Framework Plan of 1980.	Not Applicable	Not Applicable

GLOSSARY

ACRE-FOOT. The volume of water that would cover an acre to a depth of 1 foot; 43,560 cubic feet or 326,000 gallons (approximately).

ADVERSE VISUAL IMPACT. Any impact on the vegetation or landform, or any introduction of a structure that interrupts or adversely changes the visual character of the landscape and disrupts the harmony of the natural elements.

AMBIENT AIR QUALITY. A measure of the physical and chemical contaminants in the air at a specific place and time or time period (annual, 24-hour, etc.).

ANIMAL UNIT MONTH (AUM). The amount of forage required to sustain a cow with calf at side for one month.

ASH. Unburned residue of combustion, either as clinker or as pulverized particles.

DOMINANT VISUAL ELEMENT. The basic element in a particular landscape; the feature that by itself determines the type of landscape and view.

EMISSION STANDARD. A legal or regulatory limit of the amount of a specific contaminant that may be released to the atmosphere from a specific source.

FLOODPLAIN. The relatively flat, low lying area next to a river channel that is susceptible to recurrent flooding.

GASIFICATION. Process of converting lignite or other organic matter to gaseous fuel; e.g., to methane.

GROUND WATER. Water that occupies interconnected pore spaces in the earth below the water table and that can be removed through wells.

HABITAT. The area or type of environment in which an animal prefers to live.

LIGNITE. Brownish-black coal that is between peat and subbituminous coal in degree of consolidation and Btu content. Lignite has less than 8,000 Btus per pound on a moist, ash-free basis.

LIQUEFACTION. Process of converting coal or other organic matter to a liquid fuel.

MEGAWATT (MW). A unit of electric energy equal to 1 million watts or 1,000 kilowatts.

METHANOL. Methyl alcohol (wood alcohol) combustible product of liquefaction of coal or other organic matter. Used with 90 percent gasoline to make gasohol.

NITROUS OXIDES (NOx). Various air contaminants composed of nitrogen and oxygen; produced as a result of combustion processes.

OVERBURDEN. Soil and rock lying above a coal bed or other mineable deposit.

PARTICULATE MATTER. Any material except water that is or has been airborne; usually refers to dust and sand-sized particles.

SLUDGE. Viscous dark waste from coal-conversion facilities or other sources.

SURFACE WATER. Water that is at the land surface in lakes, swamps, and streams or is moving across the surface (sheet runoff) to one of the above.

TOTAL SUSPENDED PARTICULATES (TSP). Sum of airborne particulate matter from all sources measurable at a given point in space and time.